NATURE MAGAZINE

35 CENTS

JEX

MARCH 1928 VOL. 11, NO. 3

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Organized to Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

Report *of the* President

Herewith is a summary of the annual report to the members by President Arthur Newton Pack. Members desiring a copy of the report in full will be mailed one on request.

In making his annual report to the members of the American Nature Association, our President, Mr. Arthur Newton Pack, points out that the largest stadium in the world would not suffice to hold all of the members were they gathered in a meeting. Nor could they, living as they do in every one of the United States and its territories, in every province of Canada and in every civilized foreign country, feasibly be brought together. Mr. Pack, therefore, touches upon the varied activities of the Association in a printed report.

During the year friends of the Association constructed for its offices a new building adjacent to the old one on Sixteenth Street in Washington. This change has enabled the staff of about forty to do their work in adequate quarters consistent with the growth of the work. This new building has been visited by many members and by friends in the scientific world.

The Association has actively carried forward its campaign for roadside beautification and protection. Its Outdoor Good Manners cartoon contest was a notable success. In this connection and in relation to other conservation work, the Association is constantly in touch with other organizations in the field of conservation.

The past summer witnessed another successful expedition of the Association, this time to eastern Oregon, Glacier National Park and Alberta. Some remarkable motion and still pictures of wild life were obtained and the story of the expedition reproduced in Nature Magazine.

During the year the Association initiated and carried out a unique plan for encouraging interest in Nature lore and forestry in summer camps. Dr. William G. Vinal, accompanied by Mrs. Vinal, made a special camp tour of demonstration covering fifty camps, the results of which trip are being published in Nature Magazine in order that they may be of general use to camp directors and campers.

Through Life Memberships and contributions from our members it has been possible to carry forward various educational projects. Notable among these has been the publication of *The Nature Almanac*, a compendium of Nature material never before made.

An educational news service for the press of the country has been maintained and has enjoyed the most cordial cooperation of the nation's editors. In this way the word of Nature has been carried to many.

Closely affiliated and identified with the American Nature Association is the American Tree Association, noted for its leadership in the forestry movement. This organization has distributed, free of charge, 1,600,000 copies of the *Forestry Primer*, an accomplishment without equal in this field.

Various improvements have been made in Nature Magazine, a policy which is constant as the resources of the Association permit. New printing arrangements have improved its physical character; covers in four colors have been adopted for each issue; a notable program of color pictures has been planned, and every effort is being made to keep the editorial policy at the high standard expected of it by the membership.

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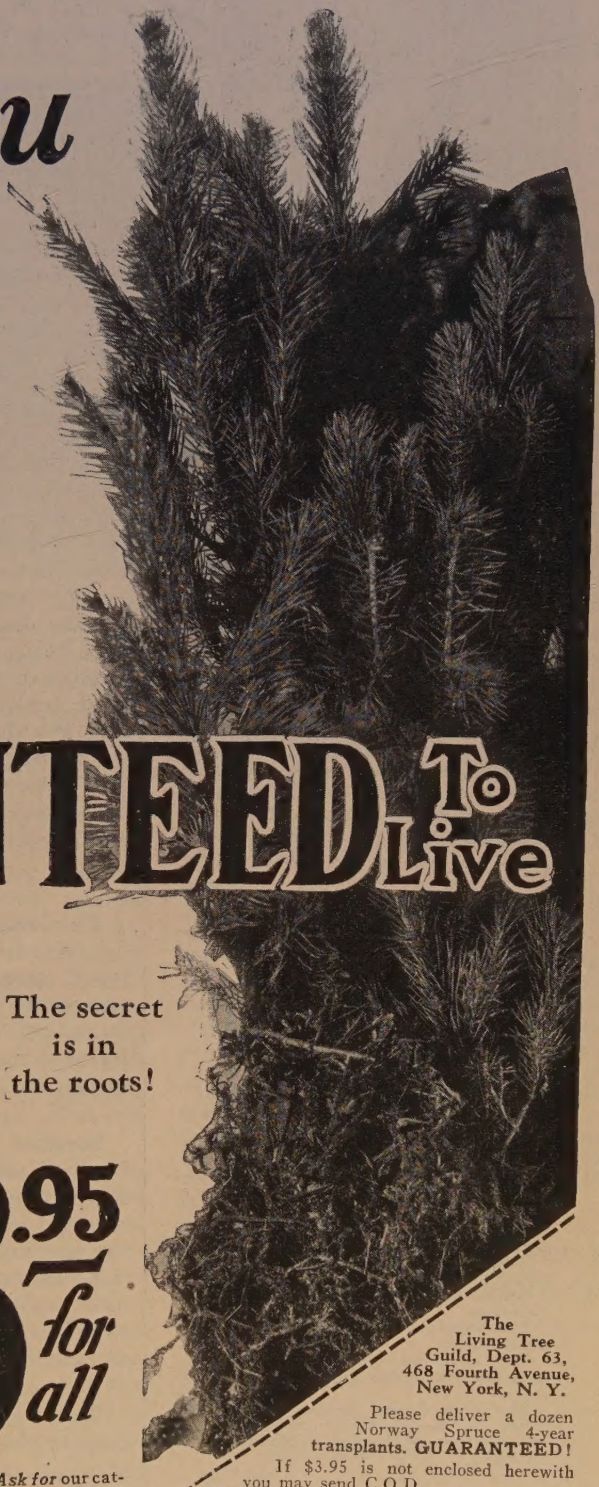

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While March winds are blowing winter out with snow, rain and freezing blasts, you can revel in the sunshine of this wonder land of warmth and beauty—of glorious flowers and luxuriant fruits. If comfort, gaiety and sport lure you—if majestic scenery thrills you and age-old mysteries awe you—come to SOUTH AFRICA.

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South Africa

Travel DEPARTMENT

Readers of this column are urged to write to the Travel Editor for any information desired relative to travel, whether it is for short distances or long distances. To every inquirer will be sent, by return mail, some definite information and this will be followed by special literature regarding the places about which they desire information. This department is designed to be of direct personal service to the readers of this magazine.

It is not too early to plan summer trips to Europe. Many travelers like to arrange a trip at a time when they can take advantage of winter rates or intermediate rates, both of which are lower than the regular summer rates. The summer rates on most of the lines go into effect about the middle of May. The winter rates on many end about the 1st of April, and the intermediate rates are between that date and the date when the summer rates start. Many of the lines offer excellent accommodations at moderate prices on cabin boats, the fare being considerably less than the first-class fare on the larger boats. These cabin boats take a longer time to cross than the first-class boats but are altogether comfortable. They are very well patronized.

* * *

The companies booking passages for the Mediterranean spring cruises report an unusually large number of prospective passengers asking for information, as well as large bookings for trips that are to start in the early spring.

* * *

Summer cruises to Norway, the North Cape, Spitzbergen, Iceland and other cooler countries are being encouraged by the distribution of attractive literature by a number of steamship and travel companies, and as these colder countries are gaining steadily in favor for midsummer trips an excellent season is expected.

* * *

While it may seem to be early to think of planning trips to the National

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Howard H. Cleaves

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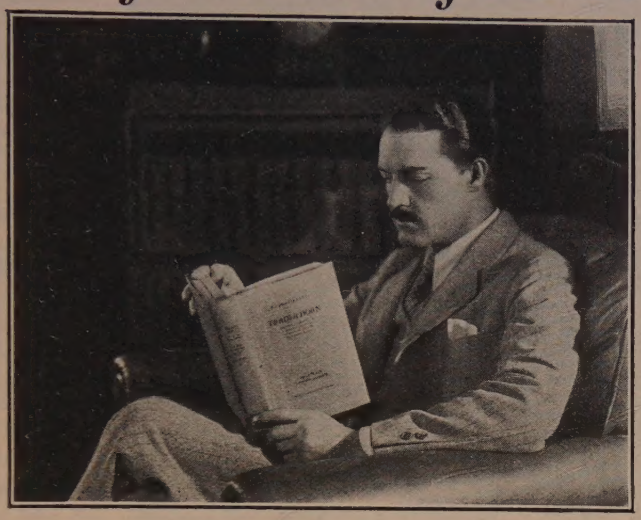

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* * *

The United States Lines announce that reservations can be made for special sailings to the Mediterranean, including stops at Algiers, Naples and Genoa. The *S. S. President Roosevelt* and the *S. S. President Harding* are being used for these special cruises, of which there are to be four in the early months of this year.

* * *

Bermuda has long been one of the favored spots for those planning a short trip at Easter time. The semi-tropical climate, peaceful seas, and brilliant coloring of the plant life recommend the island to any desirous of a change of atmosphere after the winter. During the Easter season particularly the lilies are remarkable, growing abundantly all over the island, and in many cases being shipped to all parts of the world. Another feature which adds to the popularity of Bermuda is that it is only 2-days trip from New York, with comfortable boats sailing at frequent intervals.

* * *

Thomas Cook & Son announce a Blossom Time Tour from the East across the continent and back to New York. The fare is reasonable and stops are made at such well-known places as the Grand Canyon, the more interesting California cities, the Yosemite Valley, and Salt Lake City. Such a trip in March and April has the advantage of showing the traveler the flowers and blossoms of California at the height of their beauty.

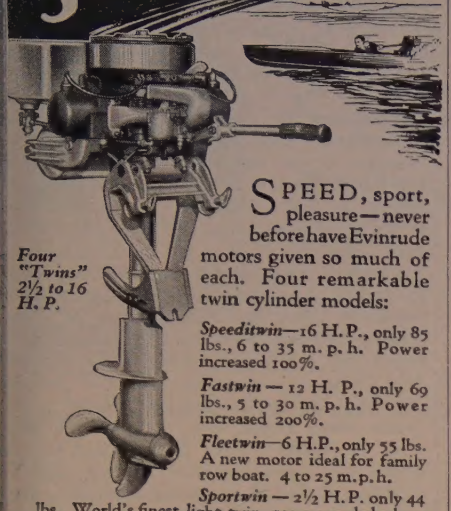
* * *

This department has on hand some literature concerning the southwestern states, particularly Arizona and Texas. Because of their delightful climate with a very small percentage of rain they are highly recommended as health resorts. The many charming old missions, the awe-inspiring Grand Canyon of Arizona, and the variety of the scenery, are some of the reasons for the increasing popularity of the southwest.

* * *

Raymond & Whitcomb Co. have announced an Easter cruise on the *Samaria*. This is a seventeen-day voyage in the Caribbean, where one may enjoy the beauties of a vivid tropical spring. Stops will be made at the chief ports in the West Indies, and inland excursions arranged.

3 to 35 M.P.H.



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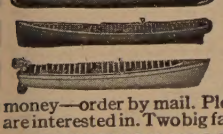
Get the flashlight habit. It's a bet Ike Walton wouldn't have missed. And insist on Eveready Batteries.



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How can you get a successful photograph of raindrops falling on a dark day? H.W. F.

So far as I know this has never been accomplished nor do I believe that it is possible. Rain has been indicated in photographs made during a heavy storm, when the rain was falling in what is popularly known as "sheets", by a blurriness of portions of the picture but I do not believe that the outfit has yet been invented that will photograph individual drops.

What would you call a good camera outfit? J. C. B.

This question was answered at some length in the January issue. Of course it largely depends upon the character of the work that one wishes to do with it. For ordinary, all-around work there is no outfit, according to my idea, that can excel a long focus view camera (for use with a tripod) with both front and rear bellows' extension, fitted with a Tessar, series IIb. lens and a shutter of the type of the Volute that is capable of working mechanically to give exposures ranging from one second to 1/150 of a second and also time.

What is wrong if every time I try to get a print from a negative the paper turns black? H. W. F.

You do not say what kind of paper you are using but I assume it to be one of the developing papers such as Velox. If this is so then your trouble can be laid to one of four causes: The paper may be old, look at the expiration date on your package. You may have too strong a light in your dark room, of course you know that you must never expose this paper to any other than a ruby light. You may badly overexpose in the printing, with a negative of ordinary density but a few seconds is required one foot from an incandescent bulb. You may possibly not have sufficient bromide in your developer. Make up your developer carefully according to the formula that comes in every package, use fresh paper and be careful in all the printing operations and there is no reason why you should not get perfect prints.

Can you give me some advice on making lantern slides for coloring? C. R.T.

Lantern slides that are intended to be colored should be given a somewhat different treatment from those that are going to remain uncolored. In the first place they should not be quite so dense for the colors always add a little to the density. At the same time they should retain, even in the highest lights, all the detail that is to be seen in the negative. A good rule to follow is to expose and develop them to bring out all the detail possible in the highest lights regardless of the shadows. These can be reduced to the proper density, immediately after taking the slide from the hypo bath, by the application of a weak solution of Potassium Ferricyanide (Red Prussiate of Potash). This should be carefully applied to the spots needing reduction, until they are sufficiently thin, with a small tuft of absorbent cotton. Printing, of the ordinary size type, should be easily read through even the deepest shadows.

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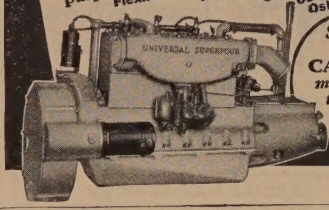

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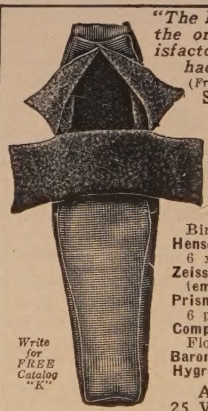

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Secondly, the film of a slide intended for coloring must be hardened or else the bristles of the brush used in applying the color will dig little holes in it no matter how careful one may be in using it. This may be done by immersing the slide in a ten per cent solution of formaldehyde immediately after taking from the fixing bath. By many this is considered to be the best method but the slide must not be allowed to remain in the solution more than five minutes or else the film will become much too hard which is almost as much of a defect as to have it too soft. On a film that is too hard the colors will run together in little globules as they do on a piece of plain glass. This may be partially overcome by coating the slide before coloring, with Japanese sizing but this is never as completely successful as one might wish. I have found that the best hardener is the regular acid fixing bath used for plates for which the following is an excellent formula: A. Water, 48oz. Hypo, 1 lb. Sodium Sulphite, 1 oz. B. Water 16 oz. Potassium Chrome Alum, 1 oz. Sulphuric Acid, ⅛ oz. A. and B. solutions should be prepared separately and when thoroughly dissolved B. should be slowly poured into A. while stirring the latter rapidly. This solution, I find, hardens the film to about the correct consistency in the length of time that it takes to thoroughly fix it.

What is the value of varnishing negatives?
D. B.

Many photographers like to varnish their negatives in order to make them impervious to dampness and also to protect them from possible injury from scratches. The following is an excellent varnish for use on glass plates: Borax, 1 oz. Orange Shellac, 5 oz. Water 1 pint. Dissolve borax in boiling water then add shellac broken into small pieces. The water should be kept hot, but not boiling, until the shellac is dissolved. It should then be filtered and, after standing several days, decanted. This may be applied to the surface of the negative with a soft camel's-hair brush or the negative may be immersed in it for a moment, removed and allowed to drain. The varnish should be thoroughly wiped from the glass side of the plate with a soft cloth.

Films may be varnished with this solution by immersing and then hanging by one corner to dry. Of course both glass negative and film must be absolutely dry before the varnish is applied.

Should it, at any time, be found necessary to remove the varnish it may be easily done by placing the negative in a clean porcelain tray and pouring over it a sufficient quantity of methylated spirits to completely cover it. After rocking the tray for a few minutes the liquid should be poured off and some fresh poured on. Usually three changes of the spirits will dissolve away all traces of the varnish but it may be necessary to gently swab the surface of the negative to eliminate it completely. The negative should then be washed in clear water.

How can you dry negatives quickly?
R. T. E.

Many times one finds it necessary to dry a plate or film quickly in order to make a print from it immediately after development. With glass plates probably the best method is by soaking in alcohol after rinsing for about five minutes when it can be dried very quickly in a warm place as the alcohol absorbs all the water with which the film is soaked and then volatilizes almost immediately. In order to be entirely successful, however, it is necessary that all of the water

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be completely absorbed by the alcohol and this may not always be the case if the alcohol has been weakened by repeated usings. In order to escape this possibility it is well to use three baths allowing the negative to soak in each one in turn for about five minutes. When taken from the last bath it should dry in a minute or so. If it does not the bath is weakened and its strength may be renewed by placing in the bottle in which it is kept a considerable quantity of dry potassium carbonate. Shake occassionally until all of the water held in the alcohol is absorbed by the carbonate which will show by its collecting at the bottom as a heavy liquid. The renewed alcohol can then be decanted off. In order to avoid reticulation marks in the drying and to facilitate matters the negative may be placed in a 5% solution of formaldehyde for a couple of minutes after removal from the hypo in order to harden it somewhat. As it is next to impossible, since the passage of the Volstead act, to obtain pure grain alcohol, denatured alcohol may be used or Methyl alcohol, which may be obtained from any chemical supply house.

As the use of alcohol, or spirits, in any form, on cut or roll films is apt to cause them to shrink the Potassium Carbonate method is recommended for use with them. The film should be fixed thoroughly in a good acid fixing bath, immersed for a few minutes in a 5% foundation bath, thoroughly rinsed and as much water as possible eliminated by the use of a soft rubber squeegee. It should then be placed in a saturate solution of Potassium Carbonate for about three minutes, removed, drained thoroughly and squeegeed dry. If necessary the surface may be rubbed dry with a soft cloth and it is then ready for printing. The entire operation occupies not more than three minutes but after the prints are made the film must be thoroughly washed in running water for at least an hour before being finally dried and put away else it may later develop stains.

Have You Entered the Photographic Contest?
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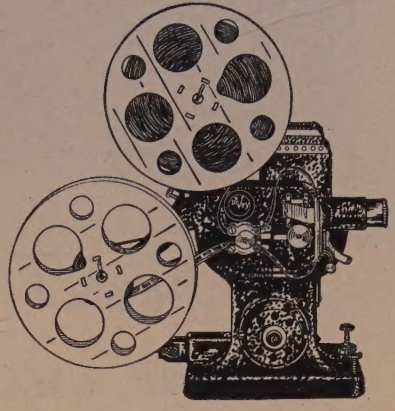

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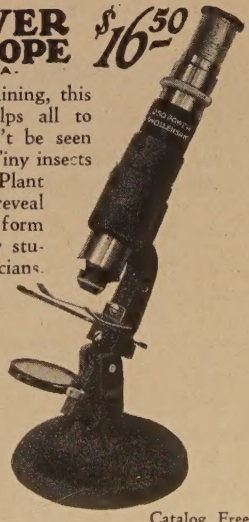

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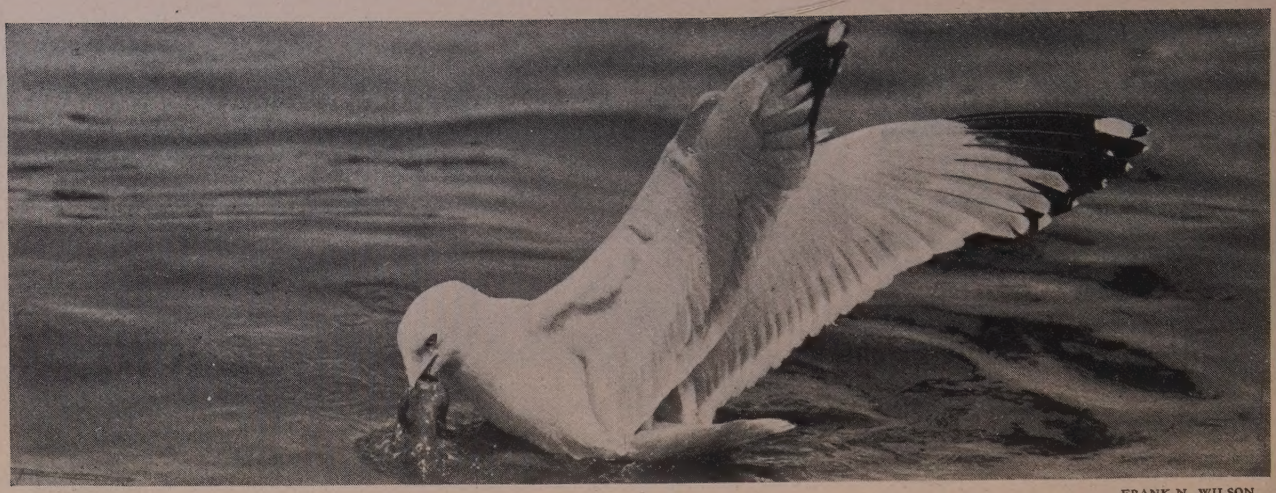

FRANK N. WILSON

THE HERRING GULL GOES FISHING AND IS CAUGHT IN THE ACT

NATURE MAGAZINE

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To Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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CANADA LYNX—*Lynx canadensis*

BOBCAT OR WILDCAT—*Lynx rufus*

A Sextet *from* American Catdom

by Carra E. Horsfall

(Color Plates by R. Bruce Horsfall)

A TYPICAL AMERICAN
Our bobcat is perhaps the best known of the wild cat family

THE jaguar is the most powerful as well as the most beautiful of American cats. Its color and markings are similar to those of the African leopard but it is a larger animal. Greatly feared because of its strength, it is not known to attack human beings, but is destructive to game birds and mammals as well as domestic cattle. The jaguar is found in tropical regions of both Americas, and ranges north into Texas, New Mexico and Arizona, and south into Argentina. It frequents the low dense jungle and the wooded banks of streams where it preys on the giant rodent, capybara. In the densest forests of South America, there occurs a melanistic phase, very beautiful because in certain lights the spots show through the coal-black fur. It is wrongly considered much more fierce than the yellow phase. Jaguars measure from six to eight feet in length.

The animal known as puma, mountain lion or cougar has the greatest range of any American mammal. The high Rocky Mountains, the arid Southwest, the humid forests of Central and South America, all provide a home for this creature which adapts itself to varied conditions of climate and environment. Though usually nocturnal, it may be found about during the daytime in regions where it is not constantly hunted. Like most cats it is shy, and, even though it is powerful enough to be dangerous to man, in only rare instances has it attacked human beings. It utters its weird cry as it tirelessly wanders from place to place. When it hunts, it silently and cautiously stalks its prey until near enough to leap upon it. In its den among rocks there may be two to five pale brown kits showing the ancestral large dusky body spots and dark bands on tail. The length of the adult is seven to nine feet.

In the United States the ocelot is found only in the lower thorn- and brush-covered valleys of the Rio Grande in Texas. It once ranged as far north as Arkansas and is still common in the forests of Mexico and south to Patagonia. No two animals have identical markings but the characters are so distinctive that no mistake is likely. The tiger-cat climbs easily, hence preys upon perching birds, including chickens, as well as small mammals and reptiles. A fondness for lambs and young pigs causes considerable loss to ranchmen. It travels over much territory on its nightly hunting expeditions, but spends the days quietly hidden in some sheltered place. Though heavier and more muscular than the bobcat, it is generally an inoffensive creature, less fierce than most cats. When trapped it takes the matter calmly, accepts its lot without protest, and makes no effort to escape. There are usually two kittens, born in the fall. Adult length is two to three feet.

The long body and tail, short legs and small flattened head give the yagouaroundi an otter-like appearance. The two color phases are characteristic and for a long time led scientists to believe they were distinct species. It makes its home from the dry, sunny, brush-covered lowland of southern Texas, through the intervening tropical forests to Paraguay. It is largely nocturnal and retiring in habit, and little is known of its family life, though young have been seen both summer and winter. In the Pacific coast country of Mexico it is said to be found near streams and swims easily and well. Its slender body and ability of movement make possible the capture of prey in the densest of undergrowth, where it feeds on birds, rabbits, mice and other small mammals. It also climbs readily and so includes perching birds as well as ground forms in its menu. The length is four feet. The Canada lynx is the large northern form found from the tree limit throughout Canada and into the United States in the Sierra Nevada and Rocky Mountains as far south as Colorado. It was once at home in the northeastern States. It is a beautiful cat and admirably adapted to its habitat and mode of life. The short body is covered with long, thick, fluffy fur. Its long legs carry it over the ground rapidly and aid in springing upon its prey. The feet are covered above and below with fur making admirable snow-shoes for winter. The broad round track is easily followed from one brush patch to another where grouse or hares find shelter. The lynx fluctuates in numbers with that of its chief food animal, the varying hare. The two to five kittens, marked with dusky spots and short bands, usually remain and hunt with the mother during the first year. The adult length is three feet.

The bobcat is generally smaller than its relative the Canada lynx and is found over a greater area. Nova Scotia, southern British Columbia, the wooded parts of the United States, and the high Mexican tableland are included in its range. Because of its nocturnal habits it is impossible to take a bobcat census, for only when forced by hunger will it hunt in the daytime. It is a shy, timid creature but will fight if forced to defend itself. Its stealth in hunting and the fact that it preys upon grouse, quail and other ground birds makes it undesirable in settled regions. The length is two feet.

NATURE CALENDAR

MARCH

by E. Laurence Palmer

"THE WORLD is always quick with sounds, although our ears are closed to them. Every person hears the loud song of birds, the sweep of heavy winds and the rush of rapid rivers or the sea; but the small voices with which we live are not known to one in ten thousand". The above quotation is from "The Nature-Study Idea" by Liberty Hyde Bailey, whose birthday is in March. The quotation and the whole book may offer most profitable inspiration for observations for March.

In March, brooks are beginning to wake up. Running water may be heard at practically any time of the year. At night, the calls of the vanguard of migrating birds may be caught from the darkness. Frogs are calling from their breeding grounds at some time during the month. Hollow trees begin to produce strange noises as the result of the activities of the birds or mammals that are using them for their homes. Are you a "one in ten thousand" who can get profitable experiences from Nature through your ears? They tell us that when Agassiz was confined to his bed by sickness and forbidden to work he amused himself by concentrating on the sounds of Nature that forced themselves into the room in which he was confined. To be sure many people are informed upon Nature through the spoken word but this is merely a make-shift proposition.

March is a month of smells as well as of sounds. These vary from the unpleasant stench of a thawing cabbage field to the delicate fragrance of some of our spring flowers. It is a splendid month to test one's ability to identify twigs of woody plants by their odor because at this season sassafras, sumac and spice bush and other strongly aromatic twigs are at their best. From these you may turn to such fragrant woods as incense cedar, the pines, spruces and other cone-bearers. Fully a dozen kinds of wood have such strong, characteristic odors that almost anyone with any experience may identify them with ease by their odor. Are you among those with this ability? In March the trees are generally beginning the most active growth of the year and the woods are particularly fragrant.

For years the human race gave little or no attention to those things which were not self-evident. The technique of gaining knowledge of micro-organisms which we now know affect our lives profoundly has been developed within comparatively recent times. Forty-six years ago the twenty-fourth of this March, Robert Koch announced the fact that he had discovered the organism responsible for tuberculosis. Since that time great progress has been made in freeing our kind from the ravages of the disease. Had Koch, his colleagues, predecessors and successors been satisfied with the things in Nature that are self-evident our fears and worries would be infinitely greater than they now are. Bacteria and other micro-organisms are responsible for many things that may be seen in March. Last year's leaves are decaying because of micro-organisms and are forming food possibly for the very tree from which they came. Examine some leaf-mold and discover how deep in the ground you may find leaves whose identity you may determine. Micro-organisms do not normally thrive at January and February temperatures but with March things become more to their liking. Notice in March how active they are in clearing the ground for this year's crop of life by assisting in rotting away those of last year that lost out in the struggle. Without these organisms life could not continue on the earth.

Seeing, feeling, smelling, tasting, hearing, reasoning and manipulating all were involved in the success we have made in improving living conditions for humans, and all of these may be exercised in a way on every trip afield. Check yourself up on your ability in these lines.

A trip through the woods in March may show you some ground pine growing in rows as straight as a gardener might plant them. Can you determine how this happens to be? The method of growth of these plants is most interesting and worthy of investigation. Many of them are much older as plants than the tall trees in whose shade they may be growing.

In March, we all enjoy the privilege of getting down on the ground even though we may get wet in the act. Spread back the leaf covering from such roots as produce most of our spring wild flowers and see if you cannot read the story of growth for the last few years. Pepper-root of one sort or another may be found in the east and west and tells this story well. The stories are there for you to read if you will but open the book and attempt to decipher the characters. A wild flower will mean much more to you if you can appreciate the length of time the plant producing it has lived.

I wonder if the readers of this page are aware that a similar section appears in the "Nature Almanac" published by Nature Magazine this last winter?

AZALEAS AND DOGWOOD ALONG A GARDEN WALK

NATURE MAGAZINE

Volume Eleven

No. Three

March, 1928

DROPPED HIS LOG AND DOVE

A resounding whack of another beaver's tail was warning enough to beware

LOOKING OVER THE DAMAGE

The old fellow inspected the havoc of the dynamite and moved off for material

CAMERA HUNTING *on the* CONTINENTAL DIVIDE

We Prove How Busy the Busy Beaver Is

by Eleanor B. Pack

ON THE extreme northern boundary of Glacier National Park lies Waterton Lake, extending northward into Alberta where the Canadian Government has recently set aside the adjacent mountain area as Waterton Lake Park. This long, narrow body of water, hemmed in by rugged peaks, is as yet little known to American travelers, many of whom—in turning their faces towards the east—do not stop to realize that their own country offers vast areas equal in beauty and magnificence to either the Alps or the Pyrenees. The difference lies in that while in Switzerland one sees historic castles and costumed peasants, here history is not written in terms of the white men, but in the lives of wild animals and Indians.

Yet if Baedeker were to write a guide book for American tourists he might insert under the heading of Glacier Park a paragraph like this—"There is an old castle at the head of Waterton Lake, built and added to by the inhabitants of the region from generation to generation. It is surrounded by a moat far wider than the castle itself and the only entrances are secret tunnels beginning under water. Those who still dwell there do not know the use of firearms, their only weapons being sharp swords and daggers. Old Castor Canadensis who founded the colony several hundred years ago is, of course, dead; but his sons, his grandsons, and his great-grandsons bear the same name and, as past masters of en-

MEMBERS of the Pack-Finley Expedition of the American Nature Association last summer succeeded in taking successful motion pictures of beaver repairing a dam. The Editors believe that this is a unique accomplishment in the field of wild life photography, as very few people have ever been eye witnesses to such an occurrence. Readers who may have had an experience of this kind are urged to write to Nature Magazine about it.

gineering and construction, successively rule their people. The castle is not open to the public and the inhabitants are so shy of visitors that they ordinarily come out only in the late evening when darkness makes it very easy for them to conceal their movements."

Perhaps such a description of a beaver house might give it a more popular romantic touch and stimulate the tourist business for Thomas Cook & Son.

It was not Thomas Cook, but Tom Whitcraft, Park Ranger, who described the matter to us; and it was this same Tom who developed a plan of action for storming the castle and getting the inhabitants out to be shot (with a camera). Tom's patience was pretty well exhausted anyhow. The beaver colonies had grown so rapidly, and the waters of the Little Kootenai had been dammed and re-dammed so thoroughly, that the only trail into the region was flooded over and something had to be done about it. Bill Finley and Jim had tried with axes and levers to break the dams—all in vain; for the beaver build with green willow and alder which, sprouting rapidly, reinforce the dam with an intricate maze of tough roots. Tom had two pint bottles of dynamite and a length of fuse. The particular dam chosen for our enterprise was a long one, making a pond of two or three acres in extent, in the center of which rose the beaver castle. In the daytime the animals were doubtless asleep on their shelves or benches above the water line, but protected from prowling enemies by a dense wall of interwoven branches and mud.

THE COOK LOOKS FOR BEAVER

Vic Swedblom, artist in the kitchen and out, scans the lake for Castor canandensis

Precariously slipping and sliding on the mud on top of the long dam, and clinging desperately to elusive and non-supporting willow branches on its banks, we finally made our way over to about the center where Tom had chosen a favorable place. About twenty-five feet from the dam a large spruce grew on a little knoll of ground, so placed that by hiding behind it one could at the same time get pictures and keep dry after the expected flood. While Tom placed the two bottles of dynamite, we clambered upon the upturned roots of a forest giant some sixty feet away, covered our heads and cameras, and found firm branches to hang to. Tom lighted a match and soon the fuse was smoking, while Jim, his watch in hand, shouted, "One minute to go; half a minute. NOW!" An age of waiting, while the movie cameras buzzed—then two loud explosions, followed simultaneously by a dense black cloud and a deluge of mud and twigs. When we looked out at each other there had been an epidemic of mud measels. Meanwhile a rush of water poured through the newly-made opening.

"Quick! Make for the dam or you'll be sorry!" shouted Tom. We glanced down to see the swampy ground around us fast filling with water. Bill and I made for the tree, while the others went on back to camp to try for still pictures of beaver in the lake. Nothing happened for a long time, so we lay in the sunshine and watched the enormous beaver house across the pond for any sign of action. Mosquitoes came and crawled into our hair and ears and down our necks. The afternoon dragged slowly on. Then, as I looked at my wrist watch for the hundredth time and whispered to Bill that it was five o'clock and the sun was getting very low, a brown head appeared miraculously just outside the castle. A large beaver swam directly towards us, seemed to give a cursory look at the dam, and then vanished in the swamp to our left. The swaying of branches presently warned us that his sharp teeth were at work cutting down a willow.

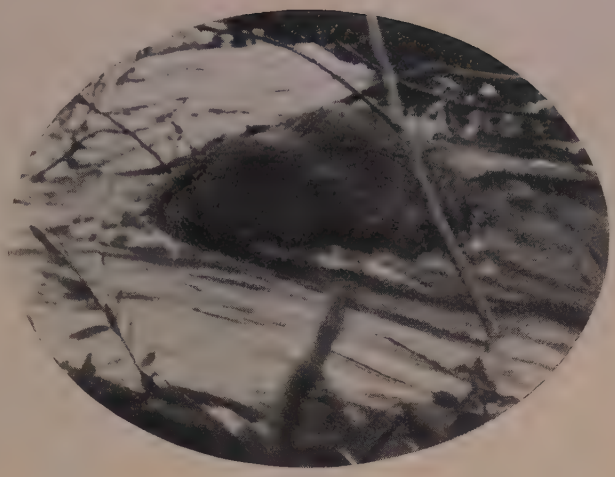
Soon the brown head appeared again, this time with a trail of leafy branches in tow, making a wide silvery wake in the still water of the pond. Bill and I popped our heads out on either side of the tree, with cameras lifted in readiness; and soon, as the beaver neared the rushing waterfall, the film began to whir through the sprockets. The noise of the machines was drowned by the rushing waters, and the beaver was so occupied that he did not notice us standing like wooden Indians at our

THE CAMP OF THE EXPEDITION AT WATERTON LAKE

This beautiful, long, narrow body of water, hemmed in by rugged peaks, is as yet little known to American travellers

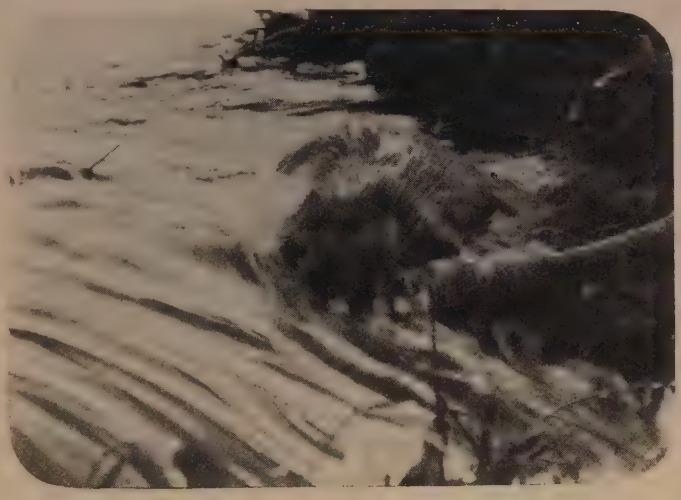
post. He made a wide circle to keep the long branch from being caught in the current, then gently floated it up so that an end was caught at either side of the six-foot opening and jammed by the force of the water. Then, with his back humped up, he thrust his head beneath the surface to plug in the ends firmly; nipped off several superfluous branches, and placed them in the network. This done, he swam away for more material. After cutting several branches, he satisfied himself with some old sticks torn out by the explosion.

Another beaver in the center of the pond spied a sudden movement by one of us and, with a resounding whack he struck the water with his tail, sending up a shower of spray high in the air. This is the danger signal of the beaver tribe, and instantly the old beaver dropped the limb he was carrying and plunged beneath the surface. He did not seem seriously alarmed, however, for he soon returned to his work. Later on another beaver emerged from the house across the way and cut some willow branches for food, returning to his home to munch away without more than a glance in the direction of the broken dam, although he must have noticed that the water had lowered a foot. In beaver land, as in other places, the old father or chief has the greatest interest in the safety of the home and colony. He it is who is out first and at work while the others are feeding or attending to other things. As the curtain of darkness falls, however, the others will usually come into action. One goes for heavier sticks and poles, but the old chief personally lays the foundation for mending the break. Others bring smaller sticks and later mud and moss to make the dam water-tight. The first sticks are put in cross-wise, then tied by smaller limbs. Others are criss-crossed and the final top sticks are pointed from the top of the dam down to act as a brace.



CONSTRUCTION GOING ON HERE

The head of the beaver family is the most solicitous about the damage and the first to set to work to repair it



PUTTING A LARGE PIECE IN PLACE

He humped his back and thrust his head beneath the surface to plug the ends of the young tree in firmly, strengthening the dam from the bottom up

The sun was sinking low and the light failing fast, so Bill decided to make a try for an extra close shot right behind the waterfall. Unfortunately, the beaver saw him and refused to return to the job. By this time our appetites gave us warning that it was long after supper time, and our watches told us that we would have to fend for ourselves, as it was after seven o'clock; so we packed up the cameras and made our way along the drier dike to our waiting horses. Next morning we found that the break in the dam had been completely stopped.

At the camp the rest waited for us, bubbling over with news and excitement. Art and Jim had re-

CUTTING LOOSE BRANCHES

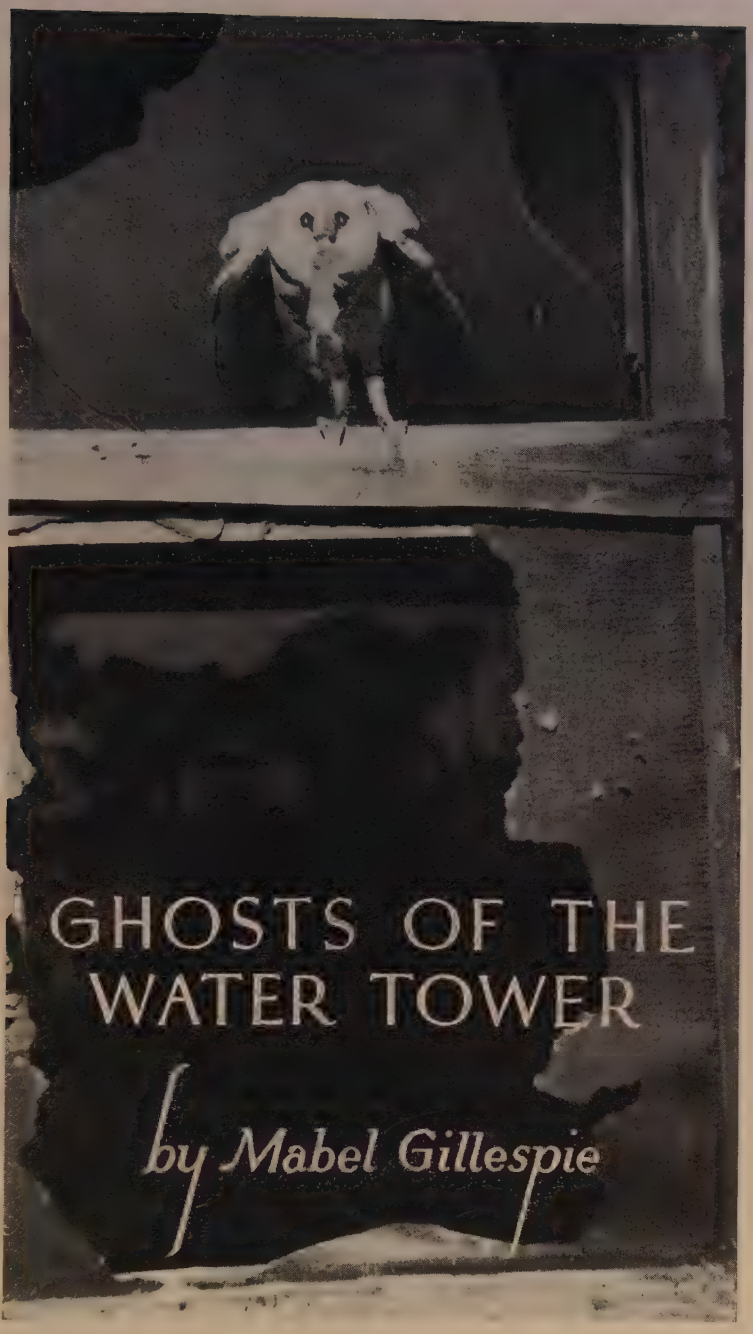
Superfluous branches were nipped off and placed in the network of the dam

turned to camp by the shore of the big lake, with the hope of catching some beaver swimming there and stealing up in the inflated rubber boat. Sure enough, about five-thirty a whoop and a shout sounded from two of our packers who were fishing near the mouth of the stream, and the cry of "Beaver!" rang across the still water. In spite of their unshaven condition, Jim and Art were well aware that this was not a score in the famous game of Beaver, but a real *Castor canadensis*. Jim rowed furiously out into the lake; and—sure enough—a resounding slap drove little particles of spray into the air a few yards away. "He went to the left," shouted Art, directing the course for Jim, but the beaver apparently turned under water, for when they sighted him again he was back in the safety zone of the willows about the mouth of the creek. As the boat drifted with the current first one and then four more beaver came out of the house, which was completely concealed in the thicket of willows that overgrew it. These fellows had apparently come out for supper, for they chose respective points of vantage along the shore and crawled out to enjoy tidbits of willow bark. One of them chose a little gravelly bar with water on both sides; and, as the boat drifted by under Jim's guidance, Art stepped out into the shallow water and stood with camera poised. A few whispered words and Jim took a stroke or two which brought the boat around to the outside of the bar. Grandpa Beaver, for he certainly must have been that at least, glanced a little apprehensively at the boat so near him and calmly turned to walk straight in front of the camera. The click of the shutter and the plash of his front feet as he prepared to dive in were almost simultaneous.

As it was getting too late to photograph, Art and Jim returned to camp, but they had hardly stepped out on the shore when again a shout of "Beaver!" was raised from Lyle and Melvin, who had come out in another boat. Art and Jim pushed out again, and the chase commenced, for this beaver was too far out in the lake to get back to his house by any single dive. Every time he came to the surface one of the boats would head for him; he would dive with a slap and then the occupants of both boats would watch for his next appearance. In this way they kept him under water a large part of the time, and after about the eighth dive it was evident that his wind was getting short. Slowly they drove him shoreward, and at last could clearly see him swimming beneath the surface above a shallow gravel bar, between the rubber boat and the shore. Jim made a quick grab, plunging his arm above the elbow. Whether it was his long experience in the woods and his trained eye, or merely fortuitous circumstance it is impossible to say; but, at any rate, he clutched the beaver firmly by the tail. Now there have been many stories, such as the one about picking up the skunk by the tail and thus rendering him harmless, the truth of which all experimenters will seriously doubt. A beaver has the finest cutting teeth in the world and perhaps the largest in proportion to his size of any mammal, excepting a walrus; but Jim's action clearly established the fact that a fat beaver can not crawl over his own stomach. Perhaps it was merely that this fellow was tired out from his protracted submarine activities; but, at any rate, Jim splashed ashore with the beaver at arm's length. A little distance from the water he set the beaver down and we clustered around him. Mr. Beaver looked rather wearily at these human beings who had somehow outwitted him at his own game. Like a captured soldier he waited resignedly for whatever fate might be his; he even suffered us to gently stroke his fur and inspect his webbed feet. Unfortunately, the dusk was fading and we could not photograph him. Someone suggested trying to keep him until morning; but how? To gnaw through a wooden box with those sharp teeth, we thought, would have been but a few moments' play for him. Later, Vernon Bailey, beaver expert of the Government, told us that he had never known a beaver to gnaw its way out of a box. In fact an old beaver tames readily and makes a splendid pet. We had no wire cage, and besides a prison was no just reward for an animal which had put up so game a struggle. We drew back and a few moments later we saw him slide quietly off the gravel bar, headed for home. Could beavers talk, this fellow certainly would have a tale for the long winter days and nights, as he gathered with his numerous friends and relatives in the warm chamber beneath the snow and ice.

With the April issue of NATURE MAGAZINE *Ben Hur Lampman returns to our pages with a remarkably fine story of the Sandhill Crane, "Sir Longshanks, the Brave". Dr. Albert A. Hansen contributes an article that will please every home owner because its title is "Enjoy the Luxury of a Weedless Lawn". Donald and Louise Peattie are the authors of a notable story of the woods in "The Story of a Sovereign". Mr. Henry J. Hamm writes on "Canaries and their Care", and Stephen Haweis contributes another fascinating story. These are only a few features of the April issue.*

The photographs that illustrate this article are the work of Mr. J. K. Potter and Mr. J. A. Gillespie, the two "owlers" of whom the writer speaks



HOME WITH A BEAK FULL OF DINNER

The owl announced its arrival with a thud as it landed on the window sill of the "haunted" tower

GHOSTS OF THE WATER TOWER

by Mabel Gillespie

NEAR the shore of the Delaware River there stands a dilapidated water tower. It is haunted. Once great windmill arms revolved about it; now it is only a weather-lashed, three-story affair topped by a cylindrical water tank. The many windows, long since shorn of glass, have been sealed over with tar paper, which time and tempest have torn into jagged openings that make weird silhouettes against the night.

Here at nights the ghosts go silently to and fro, leaving and entering the tower by the third floor windows. In the daytime with enough commotion, you may be able to scare them out and watch them sail silently through the air, to disappear over the outlying meadows.

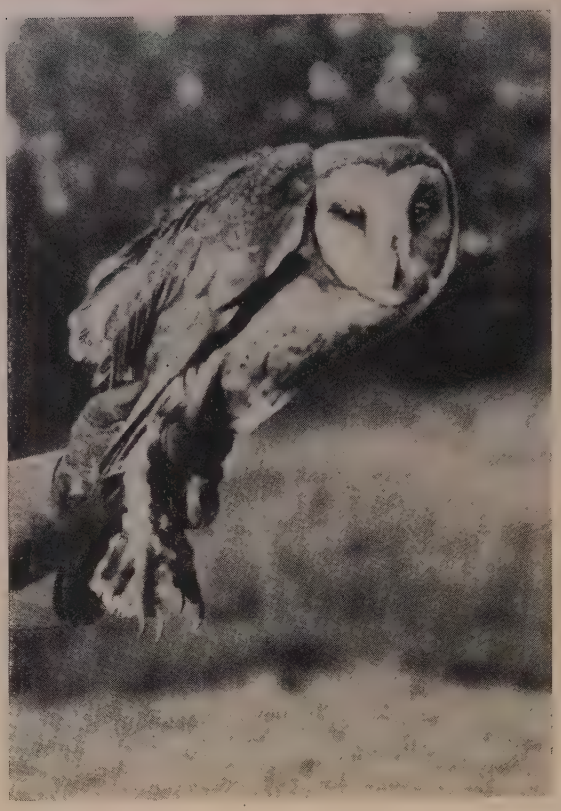
Suppose we try to inspect the old tower, which, incidentally, cannot be done without raising a racket. First, you must climb through a window into the large square room on the first floor. An open space in the flooring above speaks of former stairs, but now you must climb from a window sill to the top of a small closet and then swing up to the rafters. On the second floor you step from beam to beam to reach the other side of the tower, where stairs to the third floor are, happily, still in place.

About this time, if it is in the month of May, you hear a hissing noise, much like the sound of steam escaping from a radiator leak. As you mount to the third floor an odor like ammonia assails your nostrils. The hissing increases as you climb, and in the dim light of the interior you see, at the foot of the stairs that lead to the roof, a hole in the flooring from which the noise seems to come. Then, if you can persuade yourself that it is too high for a den of snakes, and you are brave enough to investigate the cavity between the beams and the ceiling of the floor below, you find—baby ghosts!

Perhaps you didn't know that ghosts raised families? These ghosts do, and leave about proofs of their existence more conclusive than knocks and groans. These ghosts, we will now confess, are none other than owls, and the signs of their presence are pellets,—tight wads of fur and bones from the small rodents they eat and regurgitate.

Lest your interest lag we will assure you that these are not the familiar screech owls that sometimes appear as if by magic outside your window on a summer's night, and wail with a sound like a passing motor horn.

They are barn owls, not at all unusual, but very seldom seen. They nest in hollow trees and deserted buildings, especially towers. Weirdest in appearance of all the owls, they have not the characteristic wise look of the family but are awkward and stupid looking. "Monkey-faced" they are called, and more than once the finding of a barn owl has led a local "zoologist" to proclaim the discovery of a new species, half bird and half monkey!



ONE OF THE "GHOSTS"
The mother owl of the pair that lived in the tower. She has been banded as a check upon her travels

Take a barn owl in your hand, however, and the exquisite plumage will amaze you, such a contrast is it to the humped shape and ludicrous countenance of the bird. Around the outer edge of the facial disk, in which the eyes are so oddly sunken, feather tips shade from brown to sepia. Below the face is a throat of purest white with feathers soft as down. On the breast and belly bands of buff and sepia alternate, blending softly from one to the other and dotted with brown spots. The back is marble-like with patches of brownish gold and mottled white and sepia. Alternate bars of brownish yellow and mottled sepia adorn the tail and wings, with white in place of yellow on the outer tips. The yellow, gold and brown blend harmoniously with an unusual result which should make the fashion leaders green with envy since it defies them to reproduce it in fabric.

One word of warning, however, do not take a barn owl in your hand, not even a baby one, unless you are wearing heavy gauntlets. These owls fight and struggle and their claws are no ineffective weapons.

If you visit the tower when the owls are not nesting, both of them usually fly out at the least disturbance. But when there are young birds in the nest, the mother owl stays bravely by for a time. It is a negative sort of courage she displays, however, for she does not attempt to protect the young if some curious ornithologist starts to take them out to examine and photograph. The little courage she has soon wanes and then she is off after her mate, leaving the young to the intruder.

Since it is too dark in the tower for picture taking, the young owls must be taken down and out into the open. They are very unruly, lowering their heads apparently to escape the unaccustomed brightness of the sunlight, and swaying them from side to side as animals at the Zoo often do.

Interesting as it may be to *hear* about the idiosyncrasies of strange beings like barn owls, you must have a real scientific curiosity and lots of nerve—to say nothing of patience—to spend a night in the tower watching them. If you survive the night without perishing of fright, you will be willing to believe any tale of haunted habitations.

BABY OWLS ON THEIR FIRST OUTING
They were taken out to be photographed, not for a promenade with their parents, who left them to the intruders

Just when darkness settles down definitely, the young owls start their food call, a harsh, sucking noise, quite like the sound of unmannerly soup-eating. It sounds as if the anticipation of the hoped-for meal is too much. But at the least disturbing sound they abandon this food call and return to the hissing noise. If you have nerve enough to sit on the upper stairway after dark to watch proceedings, you must be a Spartan and not swat any of the many million mosquitoes that attack you. The slightest noise of movement incites this cry of alarm, and as long as it is sounded the parent owls will not come.

If, however, you can suffer the mosquitoes in silence, things will begin to happen. After you have

A FAMILY COUNCIL
Mother and Father Barn Owl talk over the situation on the window sill

THE "HAUNTED" TOWER
Home of the barn owls. Note the upper right hand window that they used as entrance and exit

waited in the close, putrid atmosphere, surrounded by almost total darkness, until everything has become weird and eerie, you will hear a peculiar noise outside,—an "ick-ick-ick", many times repeated. Then a form will suddenly appear in the uncertain light of the jagged window opening, much in the manner of Alice's Cheshire cat. Silhouetted there, with outstretched wings, it resembles a huge and terrifying bat! The first audible sign of its arrival is the thud with which it lands on the window sill. At once the young birds take up the call for food. The ghostlike form drops to the floor and is lost in the darkness. A moment later it is again framed in the window opening, then silently vanishes into the boundless night.

The goose-flesh may be creeping over you now, but if you stir or whisper the young owls begin to hiss again in loud alarm.

When the owl returns you may try turning on an electric flashlight. In the owl's mouth you will see a field mouse held by the neck, soon taken into the nest cavity and fed to the young. As the parent bird comes out of the nest, it may be confused by the unaccustomed light and fly directly toward you instead of out the window. Then, indeed, are you tested, with this strange creature, black, blinking eyes, more monkey-like than ever, staring at you only a few feet away.

The two enthusiastic "owlers" who took the photographs and actually spent an entire night in the tower besides parts of many other nights, had all these experiences and even more thrilling ones. Once a thunderstorm raged for an hour while they endured mosquitoes and humidity, and shivered at the sound of a fog whistle blaring mournfully from a lighthouse near by. After the storm the mother owl landed on the window sill with the usual thud. She laid a mouse down beside her and calmly surveyed the two cameras mounted on tripods and the two individuals huddling together on the stairs under a piece of tar-paper, scant protection from the streams of water that leaked in everywhere. There was a silence that seemed unending. At last it was broken by a terrifying scream,—a bloodcurdling yell that echoed and reverberated within the close confines of the tower room. While the air was still shaking from the outlandish shriek, the owl let forth another scream, and continued to scream every few seconds until the cry had been uttered seven times. Then she snatched the mouse from the window sill and departed with a final snap of her bill!

Added to these frequent hair-raising thrills were the difficulties of getting satisfactory flashlight pictures. It took infinite patience and a second season of thrills to achieve success.

The owls raise a family of five, six or even seven every spring, and once a family of baby owls arrived in November. They survived the early snows that blew outside, though it must have been cold in the nest cavity because the mother owl does not provide any nesting material for softness or warmth. Perhaps she thinks her presence is sufficient because she starts setting as soon as the first egg is laid, and thus there is about two weeks difference in the ages of the oldest and youngest of the owlets.

It takes the owls about seven weeks to look grown-up, but, though they are able by this time to fly, they still hover round home and let the parents provide their food. Sometimes after ten weeks a young owl is found in the tower still depending on the old owls for food. He does not hiss now as you approach him, but tries, instead, to remain absolutely silent and motionless

MRS. GILLESPIE, *the author, whose husband and Julian K. Potter made the acquaintance of this family of barn owls and obtained the remarkable pictures, lives at Glenolden, Pa. She writes that she is "too old-fashioned to relinquish the care of home and children, and too modern to be satisfied with domesticity." Confronted with this situation she finds the solution is a "career" as amateur naturalist, being admirably equipped with an ornithological husband and a home on the edge of an untouched creek valley. The Gillespie menagerie ranges from red-tailed hawks and winter wrens, to opossums, mice and many various assorted insects.*

HERE WE ARE AGAIN
Arriving owl caught with a surprised look on its not too beautiful face

in the hope that you may overlook him as a statue.

For several years every young owl has been tagged before leaving the tower with one of the numbered aluminum bands issued by the Biological Survey. Thus it is possible in some cases to follow their movements. The parents stay at the tower, using it as a shelter for themselves the rest of the year. But the young owls fare forth to see the world. One owl was shot about a month after it left the nest at a point on the Atlantic coast about fifty miles southeast of the old tower. Another of the same brood was shot about six months after leaving the nest near Wilmington, North Carolina, four hundred miles from its birthplace. A third owl, one of the late fall brood, was brought down four months after it started on its travels on the eastern shore of Maryland, about a hundred miles from the tower. You wonder, from these records, if young owls usually set out for the sea, and then travel south.

Although it is interesting to find out where the young owls go, it is very much to be regretted that they are so often shot. They are indefatigable mousers, and the best of assistants to the farmer, who too often does not realize that the owl is a friend and not a foe. It has been estimated that a pair of field mice would multiply to a million in a year if there were no accidents to any of the offspring. Were it not for barn owls and some other mousers such as hawks and snakes, whose services, also, man seldom values, mice would become a serious menace instead of occasional visitors to our pantries.

If, then, you waken in the dead of night and hear a curious noise,—a new noise you have never discovered before, you may come to recognize it as the steady "ick-ick-ick-ick-ick" of a barn owl, sounding now louder and now softer as the bird circles noiselessly overhead, watching with searching vision for the unwary rodent. Barn owls may be among the weirdest of living creatures, and ghost-like and terrifying in their habits, but you should no longer shrink at the thought of ghosts or begrudge them their sheltering tower, but give thanks for the most efficient mousers that are known to the world.

THE BLACK WIDOW

by G. Rayson Brown

ADULT MOTHER BLACK WIDOW

The female of this spider is largely black with a red "hour glass" on its underside

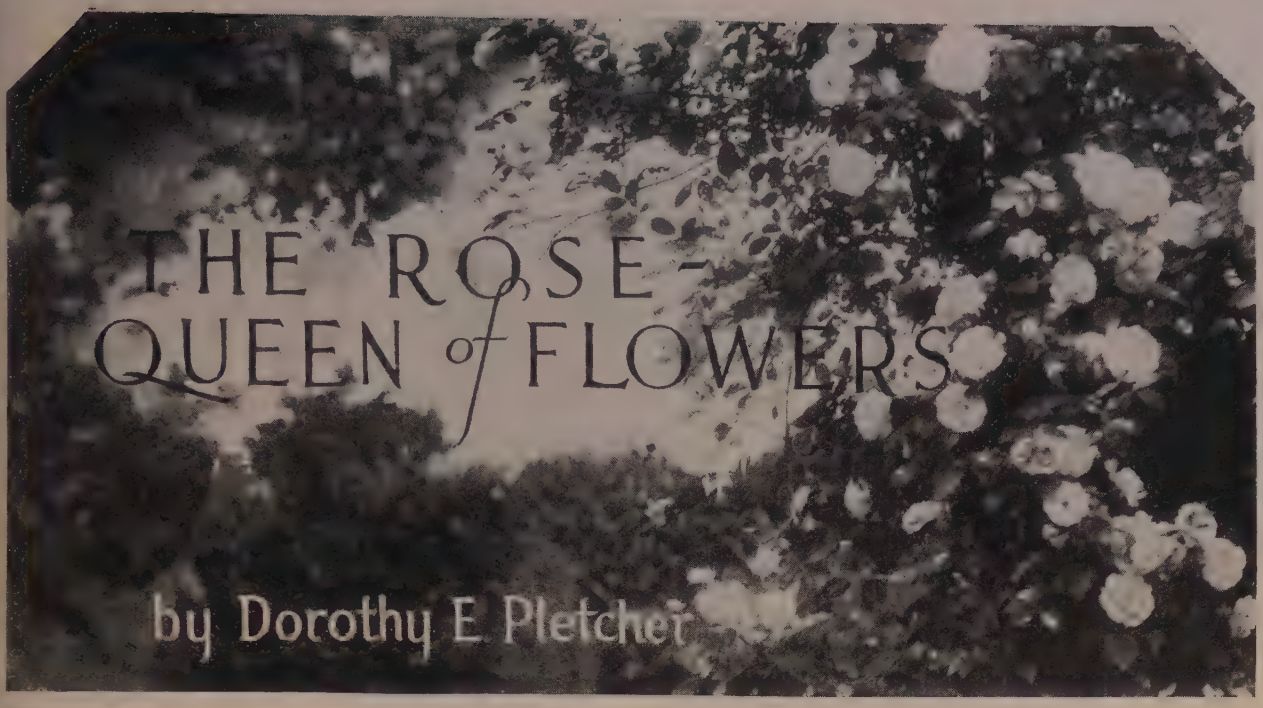
COMMON in the south and southwest is a comb-footed spider that goes by the name of the Black Widow. It may be that the popular name comes from the predominately black color of the female spider or from the nocturnal habits of them and their liking for dark places. However it may be, this spider is an interesting one and has recently been the subject of unsettled argument as to the poisonous quality of its bite.

ADULT FATHER BLACK WIDOW

The males of these spiders, which are much the smaller, have the gay markings with stripes and dots

Beside its black color the female has a red marking in the shape of an hour glass on its underside. The male is more gaily adorned, boasting spots and stripes on the top of the abdomen. The spider gathers its food by throwing a silk web, often moist, over its victims. Sometimes the prey may drop into the web and, being heavy, falls through. This attracts the spider which follows but does not attack. If the victim gets to the ground the spider entangles it deftly with its thrown web, fastens to it a tow line and hoists it to the home web for dinner.

The youngsters of the Black Widow spend a few days in the egg sac after hatching, then make a hole and emerge, soon after starting out on their own careers with healthy spider appetites and an urge to inquire.



THE ROSE—QUEEN of FLOWERS

by Dorothy E Pletcher

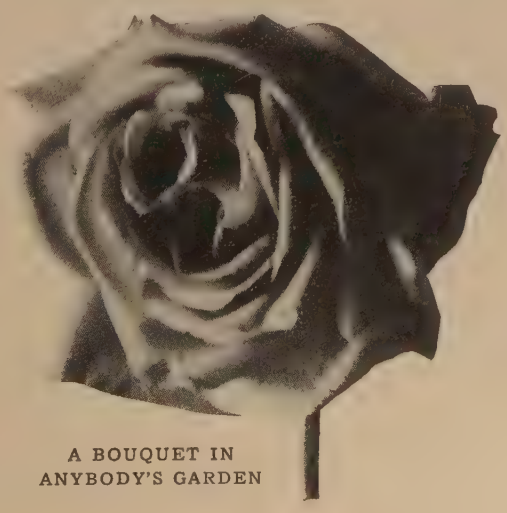
Some Advice on the Selection of Your Garden Roses and on Their Care

TWO THOUSAND years ago in Athens the rose was crowned the Queen of Flowers. It is old, extremely old, this Queen of cultivated flowers, and from time immemorial has never ceased to charm the world with its haunting fragrance and exotic beauty. The romantic songs and legends of the Greeks, the Persians and the Chinese testify that this pampered darling of gardens the world over was cultivated in earliest times. The place it holds in the heart of man is strangely unusual in that no other flower has ever succeeded in usurping its sovereignty. As one great Nature lover has so well said: "The rose is the national flower of one great race, but it is loved by all and is the monopoly of no one race or creed."

Today in America we are just beginning to have roses, that is to say, a variety of roses of American origin. It is singularly interesting to know that a basis for rose history in this country was most fittingly furnished by the man who was first in rose culture as well as first in the hearts of his countrymen—George Washington. In his delightful gardens at Mount Vernon he grew from seed a hybrid rose based on the native *Rosa setigera* and named it Mary Washington. By giving his permission for this to be grown and sold he thus started the good work of producing roses of American lineage.

The late Dr. Walter Van Fleet of the Agriculture Department followed in the footsteps of Washington in attempting to produce an American species, and just before his death succeeded in evolving an everblooming dooryard rose which is the pioneer of an entirely new rose family. Dr. Van Fleet's work in rose culture is deemed invaluable by the Government and is now being carried on in the rose test garden at Arlington, Virginia.

The rose gardener's task is a fascinating one. If he is wise he will make a diagram of his lot. In this general plan one can visualize color and beauty everywhere. Border roses are used in combination with other shrubs in any of the clumps about the house or on the borders. In the garden or in the bed between the garden and the garage cut-flower roses would be most suitable. To be appropriate for an effective use in mixed groups as shrubs the roses must be hardy and possess foliage free from insect attack. As a matter of fact, for this purpose the foliage is even more necessary than the rose blooms.



A BOUQUET IN ANYBODY'S GARDEN

These hardy roses should be used for the borders of the grounds or about the base of the house, while the cut-flower roses will find their place in the garden. Rugosa or Wrinkled Japanese rose is one of the outstanding favorites for landscape planting. It grows five to six feet tall, is rose colored, with a rough, dark foliage and blooms all summer; it flourishes both north and south. Useful for low bedding is the Dwarf Polyantha rose or Baby Rambler group which attains a height of one or two feet and is of many shades of white, pink

and red, with flowers borne in clusters throughout the entire season.

Success in the art of growing roses, as in everything else, depends in a large degree upon the interest and enthusiasm with which one goes about his task. With more than one thousand rose varieties now at hand, it is not surprising that the amateur rose grower is bewildered with the multiplicity of types and despairingly asks, "What varieties shall I plant?" If you would be successful, choose those varieties that are best adapted to your locality. Before selecting the brand of rose to plant, carefully consider the section of the country in which you live and the nature of the soil at hand. If you do not feel sure of your own judgment in the matter appeal to the nurseryman and he will tell you exactly what you may plant with a reasonable amount of success.

H. ARMSTRONG ROBERTS

WAGING WAR ON ROSE INSECTS
The rose-grower must keep an eye out for aphids and bathe them thoroughly

But, without the nurseryman, how shall one know what varieties to plant? The everblooming rose is always assured of favor in the public eye. This class of rose is divided into two groups: tea-roses, which are peculiarly adaptable for the far South, and the hybrid tea-roses which thrive especially well in the Middle States, from spring to cold weather. The following have been found to be the best dozen everblooming roses: Ophelia, Radiance, Gruss an Teplitz, Los Angeles, Mrs. Aaron Ward, Duchess of Wellington, Red Radiance, Columbia, Mme. Edouard Herriot, Kaiserin Auguste Viktoria, Mme. Butterfly, Mme. Caroline Testout.

When we come to consider the types of the rose family as a whole, the list grows rather complicated and confusing with its many subdivisions. The main groups, however, may be narrowed down to about nine: Hybrid Perpetual, Hybrid Tea, Tea, Austrian Brier, China and Bourbon, Polyantha, Noisette, Wichuraiana and Rugosa. You are safe with any one of these groups.

Because of the fact that roses for cut flowers need more cultivation and space than roses used for border planting, it is best to plant them in the flower garden or in a bed set aside especially for them. For cut flowers the hybrid perpetuals, hybrid teas, teas, Bengals, Bourbons and Chinas give one a wide range of types for choice.

M. E. HEWITT

ROSES THAT WELCOME ONE TO THE GARDEN
With the many varieties of roses now available they fit admirably into any part of the home grounds or in the garden proper

Hybrid perpetual roses, the hardiest of the cut-flower species, are the only ones that can be relied upon in the cold sections of the country, due to the fact that they are exceedingly vigorous growers. Among the best varieties of this group are Ulrich Brunner, Mrs. John Laing, Georg Arends, Frau Karl Druschki, Paul Neyron and Anne de Diesbach.

Although not as hardy as the hybrid perpetuals, the hybrid teas make up this deficiency by blooming more continuously. They may even be grown in the southern part of the Great Plains if they can be irrigated. A few of the hardiest of this group which are known to flourish outdoors are Lady Alice Stanley, Kaiserin, Radiance, Gruss an Teplitz and Mrs. Henry Morse.

The tea roses are even less hardy than the hybrid teas, but these flowers are so exquisitely lovely that one forgets the difficulties entailed with caring for them. They are particularly adapted for the South Atlantic and Gulf States and the Pacific Coast. Such varieties in this class as William R. Smith, Mrs. Herbert Stevens and Madam Cochet prove to be the most delightful of all.

L. W. BROWNELL

RAMBLERS ALONG THE WALL
One of the reasons for the popularity of the rose is its many uses

Any soil that will produce good garden crops will raise good roses. The preparation of the soil ought to be one's first thought, for the deeper the soil and the better the preparation at the beginning, the more satisfactory will be the results. Rotted cow manure is the best fertilizer; wood ashes as well are most helpful in softening the ground. More frequent applications of manure are necessary for sandy soils than for heavier ones as the organic matter in them burns out much more rapidly and has to be replenished more freely. The well-drained soil that is not too dry and is liberally furnished with organic matter is ideal for the group of cut-flower roses. Hybrid perpetuals, although not inclined to grow well in gravel soils, flourish in clay loam or in a soil with a clay subsoil. The perfect soil for the tea roses and their hybrids is a loamy one.

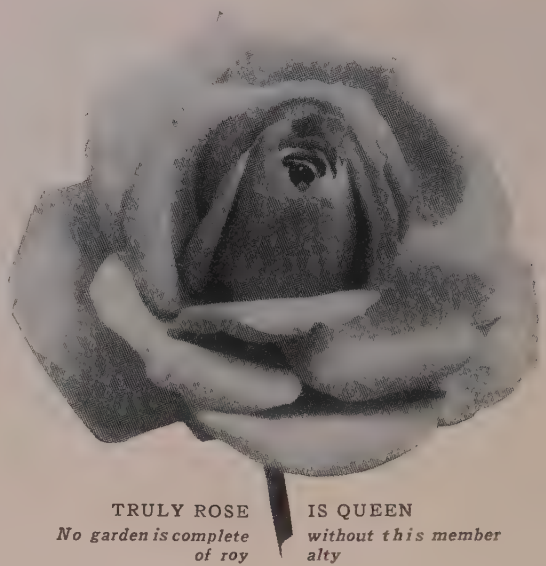
The importance of good drainage can not be too greatly stressed as roses refuse to grow where water stands about their roots. In heavy soils where water is liable to stand, artificial drainage is the only solution to the problem. To make certain of having an ideal rose

ARTHUR A. SHURTLEFF, LANDSCAPE ARCHITECT

LUXURIANCE IN ROSES BANKED ABOUT THE PERGOLA
In such a case as this the bushes should be treated to attain the most bloom possible rather than for use as cut flowers

bed, excavate to a depth of three feet, place a twelve inch layer of stones in the bottom, cover these with inverted sods, and then refill the bed with well-prepared soil. Connect this layer of drainage with some outlet so that the water may be carried off. Having done this there should be no reason why you should not have an abundance of roses.

Spring planting of roses in the Middle States may be in the middle of March, while in the South it might chance to be the middle of February. Early spring in the North would mean sometime during April or perhaps even May. Obviously the time of planting varies with the season, the location and the nature of the plants.



TRULY ROSE IS QUEEN
No garden is complete without this member of roy alty

Nurserymen refer to roses as "own root," "budded," or "grafted." By own root they mean that they have grown a rose from a cutting; by budded or grafted roses that they have made a single-leaf bud or a stick with one or more buds of one kind grow on the roots of another kind. "Stock" is the plant that provides the roots, while the one that furnishes the top is called the "scion." For the most part, roses are propagated from seed, but the unusual types will not propagate true from seed, and must necessarily be propagated from cuttings or by buds or grafts. This consists of taking some wood from the old plant to start the new one; budding being the method to take the least wood is the most widely used. Naturally enough a strong-growing variety is chosen for the stock, but the average grower would have more success with own-rooted plants because the grafted roses have to be watched so carefully to prevent shoots starting from the stock. In rooting a cutting it is a good plan to cover it with a fruit jar, thus affording the tiny plant protection from garden pests and the cold weather.

In planting budded or grafted roses one must remember to plant them deeper than own-root roses. Because of the possibility of shoots starting from the stock below the scion, the point of union between the stock and scion must be placed three inches below the permanent surface level of the bed as shown in the illustration. In this way the scion will have a chance to form roots from the part of the stem in the ground and thus become partially own-rooted. By planting the stock so deeply the chance for the formation of new shoots is eliminated.

When planting, see that the ground has been well broken up; then set the rose plant down on a little cone with the roots spread out. Sift the soil about the roots and press it down firmly and actually pound the earth around the roots with your heels. Hybrid perpetual roses ought to be set from two to three feet apart; when the grower wishes the greatest mass of bloom, the vigorous ones should be set three feet apart. Tea roses are usually planted from eighteen to thirty inches apart. A greater range of character of growth than either of the other two types seems to be the heritage of the hybrid tea roses which require a planting distance of from twenty inches to three feet. Naturally more space is needed in the warm regions where they are well watered and are not retarded in growth by cold winters or dry summers.

If the rose gardener would have strong, healthy plants he will become informed on the art of pruning. In order to obtain perfect individual blossoms of great

TWO DIFFERENT VARIETIES IN EFFECTIVE COMBINATION
A bank covered with Wichuraiana roses with Rugosas above against the background of the summer house

beauty and a succession of bloom as well, one must prune the plants severely. Such severe pruning is not necessary if one does not care about the size or quality of the individual flowers, but desires only the greatest amount of bloom. When setting dormant roses in the fall, remove one-half or more of the wood; then, in the spring cut back these roses more, leaving only two or three stems with four or five eyes on each. When planting dormant roses in the spring, prune them at the time of planting, leaving four or five eyes on a stem. Overpruning may prove as harmful as no pruning, because when overpruned the tendency of the plants is to growth rather than to bloom.

Winter protection consists in cutting back all very lengthy shoots to a height of a foot or more, and tying the shoots together so that the earth may be hilled up about each bush. This is for the purpose of keeping the plants from whirling about in the wind, which frequently causes a hole in the earth about the stem. This hole fills with water and necessarily in extremely cold weather will freeze, then thaw, all of which is decidedly injurious to the plant. Cut-flower roses in the North are in dire need of protection from the elements. Individual plants frequently are wrapped in straw or in straw and burlap. Coarse manure, straw or leaves make an excellent winter for protecting rows of bushes.

Several groups of roses are used expressly for ornamental purposes about the lawns and gardens. There are the roses that make the hedges resplendent with color, those that cover the ground and transform it into a maze of gorgeous blooms, climbing roses which beautify ugly pillars, and those that take the form of trees.

The majority of roses are not adequately branched to make a good hedge; so it is that most rose hedges are rows of cut-flower roses, pruned for a mass of bloom. For this purpose hybrid perpetual and hybrid tea roses may be used. When having a hedge, plant it in a trench three feet wide and two feet deep, and fill it with soil prepared just as if for a bed of cut-flower roses.

When we come to ground covers, it is well to notice the Wichuriana, a climbing or trailing rose, which makes a lovely cover; it is used for banks as well and makes possible charming corners of the lawn or garden.

The tree rose, which is a bush grafted three or more feet above the ground on a long stalk of a brier, is not satisfactory in some sections, because the stocks are not able to withstand the hot sun and drying winds of our climate. In western Oregon and Washington, however, they succeed, and are used in formal designs in especially lovely gardens.

The reward for our labor in ministering to the many needs of the rose is not only its fragrance and exquisite blooms—a veritable burst of glory for us after a long drab winter—but a certain sense of accomplishment in the realm of beauty which seems to add a significance to life that only a love for flowers can give us. In this year of 1928, it is certainly safe to say, the rose is once more unanimously crowned the Queen of Flowers.

ANOTHER TRANSATLANTIC FLIGHT

RIGHTLY have we paid homage to the feats of Lindbergh, Chamberlin, Byrd and the others who have conquered the upper atmosphere on man-made wings. They have mastered an element that Nature equipped only her other creatures to navigate. Yet man is not alone in his ability now to make non-stop flights alone across the trackless sea. From La Rochelle, France, comes the word that Robert Pradier, on October 1 of 1927, found "a kind of black-headed gull, known in the region as *hirondelle de mer*, or sea swallow." On its right foot it carried an aluminum ring inscribed: "NOTIFY BIOL. SURV." and numbered 548,656. The records are consulted and it is found that this ring was placed upon the foot of a baby Arctic tern, not more than five days out of the shell, at the Red Islands, Turnevick, Labrador, on July 22, 1927, by Oliver L. Austin. In a straight line from Labrador to the coast of France are 4200 miles of ocean.

This remarkable flight for a young bird is one of the most notable on record and is the second trans-oceanic bird return to the records of the Biological Survey. In 1913 a common tern was banded on the coast of Maine and four years later was recovered in the delta of the Niger River on the west coast of Africa. There are other remarkable evidences of distances travelled by birds, but surely this is by a bird of Lindberghian courage.

A WASATCH GRIZZLY

Wherein Is Told the Epic Story of Ephraim, a Great Bear

by Dallas Lore Sharp

WHEN Frank Clark's sheep allotment on the Cache National Forest was changed to the head waters of the Right Hand Fork of Logan River in 1911, he came right early upon a set of bear tracks that for size seemed to cover the whole allotment. Clark had trapped and shot many brown and black bears as a sheep man, but he had never crossed a trail the like of this before.

The new allotment extended from the Right Hand Fork of Logan River east and south to Saddle Creek Divide and over to Trail Hollow on the west. As soon as Clark had brought in his sheep, the Forest Ranger visited him, and told him of an immense bear, a grizzly, that seemed to occupy this exact territory,—had for years,—leaving him with the distinct impression that nobody in that section very much relished the idea of bagging this particular bear.

The Ranger's story and the sight of the tracks left Clark of a mind not to go out of his way to meet the grizzly if they could share the allotment in a neighborly way together. And that seemed to be the grizzly's mind too, for if Clark kept out of the bear's way, the bear kept out of Clark's, each respecting the other.

It was not until the next year, 1912, that any one in the Clark outfit caught a sight of the big grizzly, and from then on, not again until 1922. Clark thus described the first occasion to Dr. Hill:

"Sam Kemp and me was herdin' on the knoll across from Dog's Springs. It was about four in the afternoon. Sam carried a number 405 Express rifle. He was sittin' on the knoll, which we called Ephraim's Knoll, when a bear as big as a horse and lots longer came out of the brush and crossed over the curve about twenty-five yards away. The bear stopped and looked at me and Sam a minute, and then went on up the hill. Sam was a dead shot, and I said, 'Why don't you get him, Sam, ain't we killin' all the bears we can on the range?' And Sam he said, 'I don't want that bear'. He was ready that he should go just as soon as he would go. And the bear went on out of sight in the brush."

A brief and casual meeting this, but both parties got hold of the essential points of the situation, and it was not necessary for them to meet again. They divided the

"THE SKULL of the grizzly bear you mention is No. 243,406, United States National Museum, Biological Survey Collection, and was collected by George R. Hill, Jr., during July, 1922, in Logan Canyon, Wasatch Range, Utah. The skull shows damage by fire. This is all of the data we have in regard to the specimen". So runs the letter of the Assistant Chief of the Bureau.

But I have more data in regard to the specimen, given me by Dr. Hill who sent the damaged skull to Washington. And not the least interesting of it is the fact that, apparently, this is the only Wasatch grizzly on record with the Biological Survey. If that is true, then it surrounds the story of this lone bear with peculiar glamour. How came he among the Wasatch Mountains? And why did he live out his wandering life alone? For there is every indication that this bear did live alone. D.L.S.

range between them, mutually sharing it, crossing and recrossing each others' trails, but avoiding one another's presence with a delicacy and skill entirely unusual between bears and men. The impression got generally abroad that the big grizzly was a gentleman, attending strictly to his own business, and asking only that others do the same.

Of course he killed sheep, but only his rightful share of the range. When the sheep would come out on the range about the middle of June the herders would look for the grizzly's tracks, and if one man didn't find them another would, and there would be a killing. When Clark came across the tracks "goin' up the trail" he would go over and tell Joe Peterson to look out for the big bear. About the third night later Peterson would lose a bunch of sheep. Then the bear would go away for a time or start back over the Divide, and Peterson would warn Clark. On about the third night later Clark could expect a killing among his flocks. Usually it was the Forest Ranger who plotted the curves of the bear's movements and kept the herders informed.

The extraordinary thing about the situation was the acceptance on the part of the herders of this levy on their flocks as part of Nature's scheme and entirely within the grizzly's rights. The sheep thrived. It was a rich country here about the head waters of the Logan. And hadn't it been allotted to the bear before it had been allotted to the sheep? Or as Clark put it: "This much I've got to say for that grizzly: he never killed more than he wanted—not until the last two years when he had got old. He was the most gentlemanly bear I ever saw, and now that he's gone I'm sorry, I am. And I've a mind to put up a monument over his grave to say that here was a bear that lived like a man and died like a man."

Clark was not a sentimentalist. Sheep raising on the wild western ranges is not an occupation to breed any special softness. Lions and lambs may sometime lie peacefully down together, but sheep and bears cannot do it yet in Utah. The herders killed every bear that raided their flocks, and would have killed the huge grizzly had he forced the issue. Instead, he kept wisely to his own hidden ways, gave no unnecessary offence, asked only to live and let live, and so did much in that section to mend "the broken social union" between man and Nature.

The conflict between man and the larger wild beasts, his equals, and more than equals in strength, is inevitable. One or the other must rule, and there is no question as to which one of the two dominion belongs. The warfare is immemorial, and still goes on; but it has long since become a one-sided fight, and a fight without quarter or mercy. Down unto the present moment the victory sought has not been peace but extermination, the social consciousness of man not far enough evolved to include all of Nature's beings, wild as well as human.

"TRACKS GOIN' UP THE HILL"

"Peace without victory" sounded strange to our ears no longer ago than the days of the World War. We already see that human society can never again win any other victory and survive. So in its warfare with wild Nature, as we are almost fatally slow to understand. All life is one. Society includes good and bad germs, good and bad men, good and bad beasts, good and bad birds, and plants, as we see them self-interestedly; but seen socially, all plants and birds and beasts and men and germs are somehow good.

The vague, uneasy consciousness of this great truth was coming like a slow, dull dawn to the country about the head waters of the Logan. The big wise grizzly was quietly socializing Clark and the herders, and sending them to school. Of course they would have killed him, and they did kill him, as they had to, or move away, but not before he had taught them tolerance; that men and bears can live together on the same allotment, sharing, even, a few of their sheep.

And I must say that what happened finally was the grizzly's fault. But he was old, and after all he was just a bear.

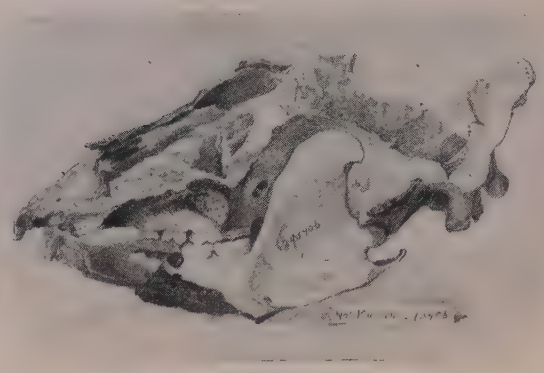
If the grizzly had been the only bear upon the range his extraordinary size and unobtrusive ways, even with his occasional raids, would have exempted him from the constant hunting that went on. But the country about the Right Fork of the Logan was overstocked with black bears, panthers, and other predators, so that the Government kept a professional trapper there to help the sheep men protect their flocks. Clark, Peterson, Ward and Nebeker shared the country about the head of the Logan, and all four of them made war with guns, traps and poison on the varmints, but from 1911 to 1922 no one "got the drop" on the grizzly, or so much as a sight of him. And no one seemed very sorry about it.

"He was too slick for me", Clark would say with a smile. "He would dodge my trail, shy my traps and spring them with sticks, and do a lot of other things to show me that there was room on the range for both of us without crowding, and as for traps—well, he didn't set any for me! That bear would make a Christian ashamed of himself."

Thus it went on for about nine years. Then the bear, growing old, and possibly morose from years alone and from ceaseless sense of danger, began to kill for the lust of killing. One night he got into Clark's flocks and killed twenty-two, then went over to Peterson's and got nineteen more. There was no mistaking the marauder, shocking as the revelation was, for the immense footprints told all too convincing a story.

This was the beginning of a degenerate and bitter end. Something had to be done, and done quickly, for there is no cure but death for this sort of thing. The best-trained, and gentlest dog in the world, once he has turned killer, must

himself be killed. The great bear rapidly went from bad to worse. Yet in spite of every effort to take him the wily old brute eluded every gun, and even the keen eyes of his pursuers. He couldn't cover his mighty tracks, but though nearly as big as a horse he had a trick of fading from his hunters as if he carried magic fern seed in his shaggy pocket.



NO. 243,406 IN THE MUSEUM
The skull of Ephraim, the great grizzly of the Wasatch Mountains

During the late fall and winter of that year nothing was heard of the grizzly, for he suddenly ceased his depredations. The sheep men concluded that the old fellow had "gone home". But when Clark came on the range in 1922 he ran almost at once upon the giant tracks. Only one bear in Wasatch Mountains could leave that terrific trail.

"Early in July", says Clark, "I thinks to myself, I'll ride up to Ephraim's Wallow, for that's what we called the little seep spring up on the knoll across from Dog Springs where Sam Kemp and me first seen this critter. He had a habit of comin' there to waller in the mud.

"So up I goes and sure as you live the brute had been there. He had squashed out a hole in the mud about as big as a wagon box, and his fresh tracks was all about the place. So I rode back to camp and got our twenty-five pound bear trap and clamps. You know this trap is so strong that you can't set it without clamps. It has three or four teeth on each jaw, and the bear that gets in that trap stays there.

"Well, I got a fourteen-foot log chain and fastened that on the trap, and set the trap right in the middle of the wallow, carefully covered. We had caught lots of black bear in that wallow, and I had a log about ten foot long which I usually fastened the chain to. So I pulled up this log, wrapped the chain round it a couple of times and wired it there good and solid.

"A couple of days after I rode up there again. Ephraim had been there, but he was gone now. Before he left he picked up that ten foot log of mine in his arms and carried it over and laid it down by the side of the trail. Then he goes over and sees the trap's unsprung and careful-like, picks it up in his paws and puts it unsprung beside the log.

"But he don't go back into that old muddy wallow. Oh, no! He goes around to yon side of the spring and digs him a brand new wallow! Wasn't he some bear, now? It hain't right to kill so human a critter.

"Well, it had to be done, I reckon. So I left the log where he had left it. Then I extended the chain and carried the trap around to the new wallow, and careful-like buried it in the soft mud, covering with sticks and dirt every sign of the heavy chain. 'Now,' I says, 'Ephraim, I'm going to get you.'

"My camp that summer was located down at the mouth of Long Hollow where this little seep spring was which the big grizzly visited. A small stream came down it past the camp, which was about a mile below the spring.

"On the very night that I had reset the trap, about twelve or one o'clock, I should guess, I was wakened by a terrible roarin' way up the canyon. Then I heard the horses begin snortin'. We had eighteen head of saddle horses hobbled in that little flat at the mouth of Long Hollow, and as the roarin' got nearer and louder the horses began to mill about on the flat till I was sure of a stampede. Then I grabbed my 25-35 and started up the canyon to face the music there rather than be mixed up with it in camp.

"It was a bear, of course, but I didn't think of the

"HE COME LIKE A MAN"
"The awful trap raised high to strike me down"

big grizzly. Yet I never heard a wild sound the like of this before. It shook me in my boots. It started kind of low, like an old bull's bellow, and wound up with a roar like a herd of lions. And comin' down the narrow canyon at me in the dark made me all goose flesh, and pretty near horse flesh too; for I was about ready to stampede.

This remarkable story of Dallas Lore Sharp's is the fifth in a group of articles from his pen. It is not the last from this gifted Nature writer, who describes himself as "always a watcher in the woods".

"There's something hereditary, I suppose, the way our nerves rear up and pull their picket pins and gallop off from the dark. But mix wild beasts in with the dark, and steep, close walls, and I go loco in spite of any 25-35, though there ain't a better gun made to be a fit companion on the range.

"The sound seemed to come down to me from a clump of willows about three hundred yards up the draw. That's why it never occurred to me to think of the big grizzly, for the trap was fully a mile up the canyon and no bear could get away down here with that trap. All I knew was that something was in its last agonies, or in such a fury comin' down the canyon as to take my tent and the horses on down the mountain with it.

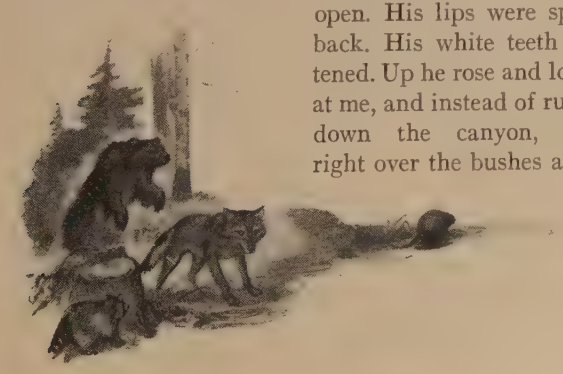
"As I stumbled up the trail in the dark I heard him groan in the willows, or thought I did. But I guess he heard me comin', for I went right past the willows, within five feet of them, and never a sound or a stir. I didn't push in amongst them to be sure, not in the dark. When I got well above I turned around and stopped. Whatever it was must be in that thick willow patch. And I sat down to watch.

"I had hardly got my gun across my knees when the whole canyon began to thunder with the roar. I had had enough, and I was altogether too close to them willows. I just needed to hear that sound from where I sat to start me up the canyon on the jump. I spotted a burnt pine stub about fifty feet up on the wall of the draw, and didn't lose no time getting up to it either. I sat there shiverin' till morning ready to climb that pine if I had to.

"By and by everything got quiet. When it came daylight I went down near the willows and threw some stones in to see if I could start anything, but there was nothing there.

"Just then, down toward my tent, I heard a low groan, and creeping along I could just see the shape of something movin'. It was furry. A bear I was sure, and I fired. The bullet grazed the shoulder of the critter, and up rose the form of old Ephraim, the great grizzly!

"He stood head and shoulders above the bushes. He had the bear trap on his left paw, and he had wrapped the whole chain about his caught arm. His mouth was open. His lips were spread back. His white teeth glistened. Up he rose and looked at me, and instead of rushin' down the canyon, came right over the bushes at me.



"I was froze stiff. I couldn't run. I couldn't shoot. I never saw a more terrible sight. He didn't come like a bear. He come like a man, a great hairy giant of a man, his left paw with the awful trap raised high as his head to strike me down. But I had to shoot. The ball knocked him down. He was up and comin' on. I shot again. Again the ball knocked him down, and he stayed down till I got some four feet higher up the wall, when on he came. I stopped him once more. But nothing could stop him. Half a ton of awful fury he came, as if death itself were driving him. I emptied the last shell into him, dropped the gun and ran for my life, the great brute almost breathing upon me.

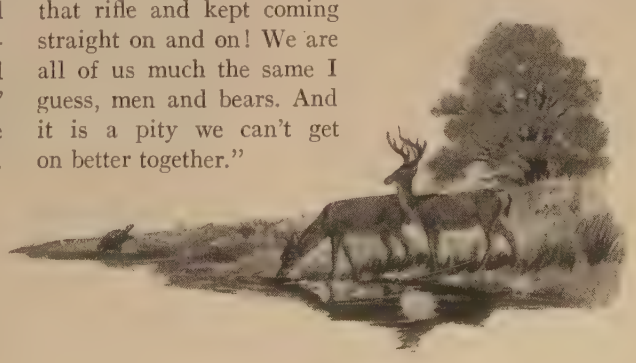
"Then I heard my dog at the bear's side, and the great beast turned to strike him. But the lead had done its work. He rose high up and looked without any fear or malice at me, just like a Christian, then crumpled and spilled into a lifeless heap.

"I couldn't move for a whole minute. My knees wouldn't hold my weight. Besides I felt just like I had done murder. There's something terrible human about a bear. When I got down to the camp there wasn't one of the eighteen hobbled horses there. But I saw my gray mare over in the sage with her hobble caught in the bushes, and takin' her I rode over to Peterson's and got his herder, Joe Brown, to come back with me. We could hardly get the horses up to the bear. When we finally got him lassoed the two horses together couldn't drag him off the trail. I had pulled many a steer from the saddle horn, but we couldn't budge that bear.

"We rode up to the seep spring for the clamps in order to get the trap off of his foot, and all the way down found that he had come along on his hind legs, never once dropping to all fours. About four rods below his wallow we came upon the log. It had got caught in some aspens. He had broken down the small trees and chewed up others to get free. But he couldn't get free. Then he chewed the heavy log in three places nearly through, until finally it broke and the chain slipped off. I never want to trap another grizzly.

"He was the length of a five-foot shovel and two double spans from the tip of his tail to a point midway between his ears, or about nine feet long, as we reckoned him. I uncovered a lot of dry willows and piled them on top of him, and set them afire.

"And I'm sorry he's gone. That bear belonged to the range. And I wasn't so afraid of him alive as I am now he's dead. And he *was* like a man! The way he faced that rifle and kept coming straight on and on! We are all of us much the same I guess, men and bears. And it is a pity we can't get on better together."



The Wood Thrush

by Gayle Pickwell

Photographs by the Author

STANDS FOR A MOMENT BESIDE HER NEST

Then she hops to the rim and looks with affection at the treasures within

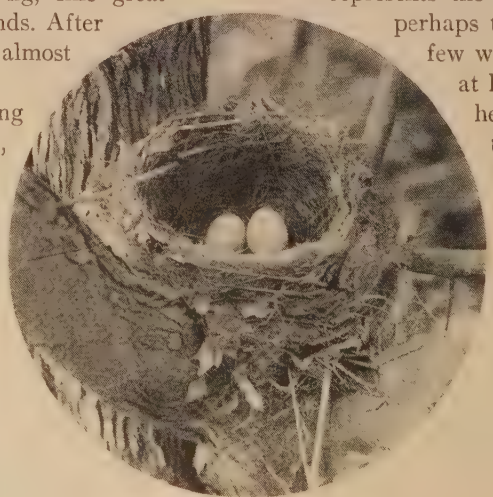
WITH a curious deep-voiced chuckle of "kuk, kuk, kuk," the wood thrush greets the evening. If the calm, or if a passing thundershower leaves a quieted earth with fresh odors of spring, then there will arise from the thicket deep, resonant, bell-like notes that outdo in glory the colors of the sunset in the west or the fading rainbow in the east.

"Come to me", sings the voice, mellow, powerful, appealing. "Come and see", higher, enchanting. "Way down here", deep, cool, compelling, like great stretches of quiet evening woodlands. After a pause, waiting, comes the last, almost impatient, "hurry up"!

That invitation, in the descending cool of an evening in May or June, carries the essence of all that is compassionate in bird music, none other quite so stirs the emotions. To him for whom the outdoors is the only perfect temple this song provides the complete and the sublime in vesper services —with mystery, deep intonation, peace.

To one who stands too near the wood thrush at this evening summons, the effect is marred slightly by the preludes and the postludes to each bell-like group of notes. It is like an inspiration of breath at the beginning and a catch at each conclusion. He starts with a low "kuk, kuk", and then, deep-throated, sings out that woodland classic "come to me", catching at the end with a curious "cu-click". At fifty feet these extras are nearly inaudible and, when, at a quarter of a mile only the cool, clear, clean notes reach us, there is then no suspicion of aught but perfection.

There are those who believe that the hermit thrush represents the most sublime in bird music and perhaps that is true, for the comparatively few who have the opportunity to hear it at home. But where one may hear the hermit, thousands may hear the wood thrush. Not only plum thickets in eastern Nebraska but woodlands throughout the central and eastern states are home to it. City parks are favorite stations for the evening calls, and I have heard it sing in shrubs and trees of lawns in crowded cities from Nebraska to the eastern coast.



HOME TO THE WOOD THRUSH

The eggs of this bird, like its robin cousin, are blue

The wood thrush, like the robin, sings also in the early morning, again when clouds obscure the sun as well as in the twilight of evening. And, in the half-light of denser woodlands

MOTHER INSTINCT
Startled, she still refused to leave the nest

LOOKING OVER HER TREASURES
This habit at the nest is common to all thrushes (Below)

A HUNGRY FAMILY
Small wood thrushes are no exception in this

L. W. BROWNELL

it is prompted to sing even with a bright sun above the upper leafy coverts. But always, because it is so exalted and peaceful, like serene old trees, the song seems to belong to the deep, shadowy woodlands in the evening.

This is the easiest of the thrushes to know in the field. Though the back is bright cinnamon like the veery's, where the veery has a breast of buff and inconspicuous spots, the wood thrush has great numbers of distinct, almost black, heart-shaped markings on a chest and sides of immaculate white. No other thrush duplicates those characters.

The wood thrush's nest is like the robin's,—a foundation and outer wall of leaves and stems cemented well with a central wall of mud, lined within with hair and rootlets. Not only plum thickets may harbor it but haws are favorites as well. One was found placed far out on a lower limb of a great droop-branched linden. Often they are so low that, by standing tiptoe, one can look into them at the eggs,—blue, also, like the robin's.

Usually the female thrush leaves her nest at your close approach with a series of loud staccato, "kuk, kuk, kuk, kuks", that fetch the male in promptly to assist in the protest. As the robin under similar circumstances says "thief, thief, thief", so the wood thrush exclaims "thug, thug, thug!"

Recently another honor was bestowed upon the wood thrush when it was selected as the bird of the District of Columbia.

A short time only suffices for the return of the female to her nest and then, in thrush fashion, never varying, she stands for an instant quietly by its side. Hops then upon its rim and, like robin,—yes like all thrushes,—turns head sidewise for one long, quiet, seemingly most affectionate view of her treasures.

One individual thrush became so accustomed to humans or had so strongly developed her instinct to incubate that she required lifting from her nest before she would give a view of her eggs. But she was exceptional. Most leave the nest when the intruder is several feet away.

If the wood thrush is not part of your outdoor ken it merits acquaintance. Having once heard that song you will greet each spring evening thereafter with a wish to hear it again. Not sphinx moths at your petunias, or blundering June beetles on the screen, or mellow thrills of belated toads, not even the notes of the first tree cricket can bring such a sense of the serenity and calm depth of Nature as the wood thrush when, at eventide, he sings his "come to me."

An Australian Songster

KNOWN all over Victoria and south and eastern Australia, the gray shrike thrush to the left has a wide reputation as a songster. It is not like a thrush but is an inconspicuous plain gray bird with brown on its back. It builds a neat, cup-shaped nest of strips of bark and grasses, choosing sometimes a burnt-out crevice high in a eucalyptus, but more often selecting a site in a lower fork of the tree. Its eggs, which generally number three, are white, with chestnut and bluish-gray splotches. Some reports accuse these birds of destroying the nests and eating the young of other birds. The first offense seems well proved, but the latter is in doubt.

THE BUTTERFLY BLENDS ARTISTICALLY

Its coloring and natural beauty give it great possibilities for a picture that is notable, such as this one

"SHOOTING"

by Ernst Keil

Photographs by Ottillie Keil and the Author

SOME YEARS ago, toward the end of a long and dreary winter, we were considering plans for our spring and summer camera activities. We felt a hankering for something "different" and finally it occurred to us that "bugs" might fill the bill. Butterflies and moths have always been favorites with us, so we decided to try them. Having made our selection we eagerly started preparations for the approaching campaign. First a box-shaped reflector was constructed out of a few boards; to make it as effective as possible it was painted glossy white inside. Four lamps of 500 watts each were mounted inside this reflector and formed our source of illumination. An old kitchen table was pressed into service, being used to arrange our objects on. A good sized sheet of unbleached muslin furnished an excellent background. This was to be an indoor campaign as you may have guessed by now. These few details completed, we were all set for a glorious time. There was nothing pretentious about our outfit but what it lacked in artistic detail was counterbalanced by our enthusiasm and keen anticipation as to the outcome of our new undertaking. Experimentation is the spice of life and nothing sets our blood so pleasantly a'tingle as trying something new, or something old in a new way.

Before swinging our cameras into action, let us pause just long enough to consider for a moment just what kind of pictures we intend to make. Insects, like any other objects, may be portrayed for various purposes and the photographic results will,—and should,—differ as widely as the purposes for which they were taken. As insects form part of the endless variety of living things Nature nourishes kindly upon her bosom, they may be properly classed first of all as natural history objects. Then again, as part of Na-

INSECTS

A Fascinating Field for the Camera

ture's fountain "from which life and beauty floweth" they will appeal in their manifold forms and color-schemes to the ones among us who are blessed with a sense of the artistic. There are many other purposes for which insects may be brought before the camera. However, this article will deal chiefly with the making of pictures for natural history purposes.

The photographic equipment for the making of this type of picture may be any camera which allows of sharp focusing. The instrument we used happened to be a 3¼ x 4¼ Graflex, and in order to shorten the exposure time as much as possible,—although this latter item is really of no great importance,—we used cut film, super speed. A few trial shots showed that with our source of illumination, and a lens aperture of f-22, an exposure of two seconds furnished well-timed negatives. Of course, a much shorter exposure might have been made with the lens at a larger stop but pictures of this kind are of no value whatsoever unless they show a world of detail and are sharp and clear. Soft focus and fuzziness in insect pictures are reserved for the dabbler in artistic effects; for natural history pictures that would be positively fatal. So much for the photographic equipment. Let us now try to get on speaking terms with our beloved "bugs".

Butterflies and moths are not only exceedingly beautiful, but the various stages of their development are most interesting to observe and furnish wonderful opportunities for one "addicted" to a camera. For those not yet acquainted with the names and habits of these lovely creatures Holland's butterfly book and moth book will prove a source of delightful information. These books furnish not only names and describe the habits of butterflies and moths, but give very useful instructions for collecting. It is

A PROMETHEA MOTH AND ITS COCOON
Here the male Callosamia promethea has emerged and taken its place on a branch of a locust tree

LIKE UNTO THE BARK ITSELF
A Catocala resting on a tree trunk at a distance it would be difficult to see

advisable to start preliminary work for picturing insects early in the year. February or March is none too early. During these months it is easy to discover many of the cocoons dangling from the leafless branches of trees and bushes. *Samia cecropia, Telea polyphemus* and a few others are the ones most commonly found, at least in the eastern part of the country. Such cocoons, whenever discovered, should be carefully removed with the twig upon which they were fastened by the caterpillars who spun them, and taken to the studio.

A picture of the cocoon is now in order. And right here, while we patiently wait for the moth to emerge, we find our first chance for a real ambitious attempt. We may not succeed the first time, but there is nothing like trying. Let us fasten the twig with its *Samia cecropia* cocoon in a most natural way upon our studio table. Next we set up the camera, compose our picture with the utmost care and focus as sharp as possible on the cocoon. All that is needed now is that we are lucky enough to "drop in" just at the moment when the handsome moth makes her way out of her dark cradle into this world of light and sunshine. And it is a rather easy matter at that. A delicate metal contact made of two strips of thin sheet brass, an electric bell, a dry battery and a few feet of copper wire, properly combined, will notify us,—most likely at one or two in the morning,—that our presence at the studio is most urgently desired.

However, the real sport begins a trifle later, toward the end of April when butterflies appear on the wing. Assuming that our photographic equipment is all in readiness to do its bit at a moment's notice, we can now devote whatever time we have available to collecting the insects. There are several ways of doing this. Catching them with the net is one way and a field of red clover is the finest hunting ground one can wish for. But, remember, red clover attracts not only butterflies but bumble-bees as well and some of the latter are, morally, not what might be expected. You may have been in doubt about their character all your life, but as soon as one has buzzed within your trouser leg, all doubt ceases. The more practical method is to rear the insects from the eggs or larvae. One or two small boxes carried at all times in the pocket come in very handy for conveying the caterpillars, found during walks, home to the "bug-nursery." Here they are placed, with the proper food plant, in larger wooden boxes where they quite willingly "let you in" on all the secrets of their queer life. This method furnishes not only the most perfect specimens for the camera but it has the additional advantage that the creatures are always on hand and every stage of their development may be pictured just at the critical moment.

The life of our winged beauties begins with the laying of the tiny eggs by the female butterfly or moth. This then would be picture number one. Next should be shown the caterpillars as they emerge from the eggs, how they feed and grow, shedding their skin from time to time, reach maturity and are, finally, transformed into chrysalis or cocoon, the marvellous receptacle in which the imago slowly forms. While caterpillars, on account of their wormlike appearance, are rarely ever considered objects of beauty, nevertheless, they are such. Observe and study them with sympathetic understanding and you will be surprised to find that Nature hides some of her most precious secrets under a repellant aspect. The lowly caterpillar plays his part in the scheme of things, even as you and I.

Then too, do not overlook the chances for the many

PUZZLE,—FIND THE INSECT IN THIS
You are right, it is the largest of the twigs on this branch, a caterpillar masquerading most effectively

A PHOTOGRAPH OF A TRAGEDY
The larva of the tomato sphinx caterpillar fallen victim to the Ichneumon fly

unusual picture-possibilities these insects offer. Many and queer are the tricks these lowly creatures perform, they of the simple mind. There is the trait known as protective mimicry among butterflies and moths as well as caterpillars. Most caterpillars have the same color as the plant they are feeding on but some, in addition to that, assume poses when at rest which will merge them so completely into their surroundings that it is practically impossible to detect them. Among the moths a most remarkable example of protective mimicry is that resorted to by the great family of Catocalas, commonly called the underwings. These moths are of medium or large size and most of them have gorgeously colored hindwings which they, curiously enough, display only after dark. Their front wings, which have the brownish-gray motley of tree-bark, completely cover their beautifully colored hindwings during the day. When sitting, as they are in the habit of doing in the daytime, upon the trunk of some tree they look for all the world like a piece of discolored bark. Why, after all, invite every passing bird to help himself to a juicy morsel of food.

However, it is not all fun to be a "bug," and many of the caterpillars are hunted by sly and savagely cruel enemies. There is a parasite known as the Ichneumon fly. The female of this diminutive savage on wings searches out a sleek larva and then proceeds cunningly to deposit her eggs into the fatty tissues under the skin of her clumsy victim. In due time the eggs hatch and the minute larvae of the fly begin feeding upon the body of the caterpillar, eating the unlucky creature literally alive. When fully grown they spin tiny white cocoons which stick out all over the caterpillar's body. This is the time when a picture will show the tragedy most eloquently. The caterpillars most frequently attacked are of the Hawkmoth family.

The foregoing are just a few of the intensely interesting occurrences that rock and sway the destinies of inhabitants of the insect world. It is a world that pulsates vigorously all about us every moment of the day and night, and offers wonderful material for the Nature lover who deftly handles a camera.

The results of insect photography will depend almost entirely upon the skill and ingenuity of the one who plans the pictures and directs the performance of the camera. One fact however, can not be emphasized too strongly: the greatest care should be exercised in composing the pictures. Always let us be sure beyond the slightest doubt that the caterpillar we are about to shoot is crawling on its legitimate food plant; that the butterfly is arranged on the flower it really favors; that each insect is pictured in its most characteristic pose. A little study will quickly put us wise to their tricks. Caterpillars should always be photographed alive, while butterflies and moths may first be put to sleep with chloroform or the fumes of cyanide. They then can be arranged in leisure and in the most attractive way for the camera. As the wings of all lepidoptera are very delicate and easily damaged, deft fingers and plenty of patience are chief requirements. Only the most perfect specimens of insects and the most beautiful plants should go into the making of such pictures.

Very pleasing effects may be obtained by the employment of various shaped masks. These masks should be of such a size that they can take the place of the slide in the filmholder. This arrangement simplifies focusing greatly and brings the object and the outlines of the mask in sharp focus, because both are practically in the same plane.

BUTTERFLIES FLITTING IN THE FIELD
Particular care should be taken to be sure that the insects are photographed on favored plants

MR. HAWEIS, *author of this fascinating series of articles based on the Smithsonian-Chrysler Expedition to Tanganyika, Africa, is an Englishman by birth. He is the son of a clergyman-author, educated at Westminster School and Peterhouse, Cambridge, and studied art in Paris. He has travelled extensively, particularly in tropical and semi-tropical lands, and his exotic paintings are notable. He is the author of magazine articles, one novel, and a book on the Sea Gardens at Nassau. He was a volunteer member of the Smithsonian trip. Mr. Haweis is, at the moment, in Honolulu.*

STEPHEN HAWEIS

The Prison Breaker

Proving that In, You Want to Get Out, and Vice Versa

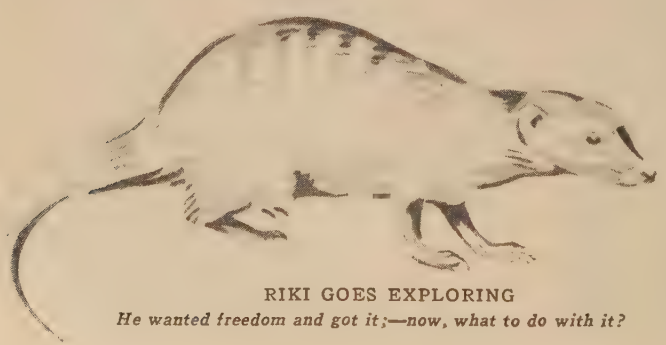
by Stephen Haweis

Illustrated by the Author

MOST of us have short memories, but there are some experiences we never forget. We are apt to remember the occasions when we said or did something singularly brilliant, though we do not so readily remember those moments when they happen to other people. What we remember about them are more often unpleasant things. People never forget, for instance, if a man has been in prison. It leaks out; it cannot be hidden, so it is better to keep out of prison as long as possible.

But there are countries where it is no disgrace to have been a convict. In the South Seas a native thinks it rather an advantage than otherwise. You do something a white man disapproves of and he makes you stay in prison and work, or go outside and work while a policeman stands over you with a gun. That is not so good, of course, but very often you learn a number of useful things. Fijians will say, "I learned that when I was working for the Government," and that means, in plain language, "When I was in jail." They consider being in prison like a branch of the Civil Service, humble, if you will, but you wear a handsome uniform covered with broad arrows. The food is good and quite free. They don't think the service is any worse than any other kind of work. The convicts are used to make roads and sometimes can be hired by farmers or travellers to do necessary work for which it is difficult to engage other laborers. The Governor of a colony will often use convicts to work in his garden and occasionally to help in the house when he gives an extra big party.

The Governor of Fiji sent for twelve convicts one day to carry dishes and wash up after a dinner party. That was fun for the prisoners and the Sergeant in charge of them posted himself just outside the dining room door where he could see in. He was particularly anxious to see that dishes were handed out correctly by the waiters, and anything which looked good he took charge of personally. He liked what was left in the wine glasses especially. It was a long dinner party and when it was time to go home the prisoners found that their jailer was in no condition to march them back to prison. He couldn't walk himself; he could hardly stand. There had been too many glasses. But they had to be in by midnight. The gates were locked for the night at that hour, and the convicts knew that the policeman would get into serious trouble if he did not get them home safely. He was a Fijian like themselves, but he belonged to the military police while they were just plain civil servants, simple thieves and murderers. They would have to run to be back in time



RIKI GOES EXPLORING

He wanted freedom and got it;—now, what to do with it?

and it happened that His Excellency the Governor himself was on the veranda when they started down the driveway. He saw twelve Fijian convicts running with a heavy burden on their shoulders, followed by a dancing convict brandishing the rifle which was intended to keep them all in order. They were carrying the constable home!

Some people, you see, would as lief be in prison as free. We had a mongoose who felt like that. He lived in a cage with another of his kind, a banded mongoose. He liked his cage well enough, but he wanted to get out, too. Mongoose are never satisfied to stay in one place for very long; they are energetic and inquisitive and like to know everything that is going on around them. All day long these two ran to and fro in the cage trying to get out and at the same time trying to see what was happening round the corner. The mongoose has long claws which he can use almost like fingers; strong little fingers which can play with a ball or catch a bird. The game they love best is football. They play it with the usual shaped ball, but since it is an egg and they always pass it to a wall or rock, the game doesn't get very far. But they hold the egg and pass it between their hind legs as well as any college center could do. After the splash there is nothing to do but eat what is left, —and the game is over!

A MONGOOSE AMONG BIRD CAGES

Not a situation that augurs well for the peace of mind and safety of birds

The mongoose never gives up anything he begins. Football or snake-fighting, it is all one to him. He is always ready to try again and, since he had begun to try to get out, why, he had to get out whether he wanted to or not. He wouldn't be beaten. People who are like that generally get what they want in the end. The mongoose was charmed to notice that the baseboard, a narrow board which was movable to facilitate cage-cleaning, was loose. He observed that it was hooked on and that it was removed by lifting. So he tried to lift it for hours at a time. At last he managed to get his nails into it and scratch it upwards. It took a long time but at last one end came loose . . . there was just room to squeeze out. And out he squoze.

To have a mongoose at liberty among birdcages is no joke, so traps were set at once all round about. We hoped for the best. Determined that the other should not get out also we nailed up the baseboard, lightly, but strong enough to be too strong for the mongoose in the cage to move. All day long the mongoose was free but in hiding: we could hear his long-drawn "chirrrr" every now and then, though we kept away in the hope that he would find a trap-bait before he began to kill birds. Riki wouldn't come out, but at last he began to realize that this freedom was not very pleasant. To be free to hide in the cuppers of a ship's hold is not at all the same as being free in the forest. He heartily wished to be back in the cage again. The cage was locked up, nailed up tight—"Chirrrr," he called to his friend, but he got a most unsatisfactory answer.

"I can't get out, and you can't get in now, because they've done something to the board and it won't move any more."

"Chirr . . can't get into my own cage!" screamed the mongoose, "I'd like to know who'll stop me."

And he started work on the problem then and there.

He soon understood that it was the nail which was causing all the trouble and he worked at it with a will. It must have taken him a long time, but it had to be done. Was he to go without supper? No, sir! And there was nothing to eat outside but birdseed and squash, unless he could get into a cage . . . there were bananas, of course, but they were all hung so high that nobody could get them. His friend in the cage would have a double ration of chopped meat. That was a terrible thought, and he worked at the nail with renewed energy. At last he got it out. The board was soon scratched out of the way and in he got, just in time, about ten minutes before feeding time.

"Miss my supper? Not if I know it," said the mongoose to the world at large, "No, chireeee!"

That was a strange thing to happen, and yet, if you knew that all the food you could eat was behind prison bars, how long would it take you to learn to pick the lock of the prison door, I wonder?

RIKI OUTSIDE; FOOD INSIDE

This would never do. Freedom at mealtime meant an empty stomach

This month Dr. Vinal gives us more helpful advice garnered on his camp tour under the auspices of Nature Magazine

CAP'N BILL SHOOTS A HAWK
This interesting pet was found at Camp Wigwam, and his habits and antics were always a source of interest and entertainment

THE CAMP *as a Wild Life Sanctuary*

by Dr. William G. Vinal

Director of Nature Guiding for the American Nature Association

WE ARE now living in a petless age. In the rush of modern life we do not find as many tame canaries, white mice, pet rabbits, and caterpillar cocoons in the possession of children as formerly. Our children are told that they must be sympathetic, and that they should gain a sense of responsibility. But how are they to go about it? Camp seems to be the logical place to develop these desired human qualities, because the summer camp offers on every hand wild animals and birds, waiting only for kind treatment to become interesting and instructive pets.

An aerial photograph of camps in northeastern United States would reveal the fact that summer camps are situated in forested lake-regions ideally located for wild life sanctuaries. Every camp director should see that the shrubs, trees, and flowers in his or her vicinity are kept uninjured, as they are the home of countless birds, small mammals, and other wild life. Cooperation with the State Game Commission or other conservation commissions in the neighborhood of the camp will often result in the lakes and streams being restocked with fish, and in further protection of the wild life in the vicinity. All that is needed for such a step is the desire for cooperation urgent enough to make conservation a concrete goal. The preservation of wild life is intimately linked with camp education. An esthetic value lies in the beauty of fine woods, rare plants, wild birds, and animals. As a source of daily interest, the disposition to protect and feed wild things develops a faith and trustfulness which can not be duplicated.

"DADDY" WELCH SETS AN EXAMPLE
It takes patience and gentleness to win such confidence from a chipping sparrow

This is not an idle dream. Jack Miner has demonstrated that it is possible to attract and tame wild ducks and geese so that they will come to a small sanctuary. Over forty years ago he went to Canada with his father and nine other children. They settled on a two hundred acre estate at Kingsville, Ontario. The average acreage of the camps listed in my recent tour is 187 acres—very similar to Jack's farm. He commenced his work in 1904 and practiced first aid on injured birds. His bird banding work has brought useful information to

the Biological Survey. Children who visit Jack Miner can feed robins on a white-topped table. Why not in camp? The book, *Jack Miner and the Birds*, is well worth reading for suggestions on bird friendship of a constructive nature.

Nearly every camp can boast of chipmunks; but, as far as we observed, only two camps — the Luther Gulick and Hanoum — could boast of taming them so that they would sit in the hand of a camper and eat. Immediately upon our arrival at Hanoum, Mrs. Vinal was taken by the hand by two enthusiastic girls and impatiently led to the rear of camp 20, where two chipmunks had set up housekeeping. The children had looked forward so much to entertaining visitors from *Nature Magazine* that they could hardly wait to tell us all about their pets—how the chipmunks had paid friendly visits back and forth, each to the home of the other, early in the camp season; and how they had grown so tame. Walnuts were quickly brought forth and tapped gently on a stone as a signal to the pets. Mrs. Chippy immediately peered forth from her doorstep and came out to get her nuts. She had just begun to eat when Mr. Munk appeared and scolded so loudly that his wife went hastily down below; but her spirits soon revived and she was back in a jiffy for more food. She had just begun to munch another nut when it slipped from between her paws and rolled down the hole. Down she scurried after it, and, since the hole was very small, she had to back out carefully, holding the nut in her paws. This time she put it in her cheek pouch for safe keeping and scampered off to hide it before returning for another. One look at the gleaming eyes of the girls was enough to know that they were having one of the happiest moments of their day. The friendship of the chipmunks was due entirely to their own efforts, and they knew that one lapse of kindness or one misdeed on their part would put an end to the trust which the animals had placed in them.

KILLARNEY, A PET AT TANAGER LODGE

Elsa found the tame raccoon a most companionable fellow, as did the others who enjoyed his confidence

At the Luther Gulick Camp we succeeded in getting a motion picture of the chipmunks taking peanuts out of a glass held by a camper. These little fellows had a back door as well as a front door. If one would keep a diary of a squirrel, or of a chipmunk, he would do well to read about Furry, a baby red squirrel, whose story is given in the *Handbook of Nature Study*, by Professor Anna Botsford Comstock.

The crow was an interesting pet at Uncas. His recorded bill of fare consisted of cutworms, grubs, grasshoppers, mice, snakes, frogs, all kinds of berries and grains. Just to forage for his daily food must certainly have impressed some very startling facts on his providers. As our visit was on the second of July the boys had not had time to catch on to Jim's mischievous ways and propensity for stealing. Since the crow was a gift of Ernest Thompson Seton,—who wrote the story of "Silver Spot",—we surmised that Uncas campers doubly enjoyed this campfire story. Other interesting things about crows and the care of many different kinds of pets may be found in Mrs. Comstock's "Pet Book". If camp directors add a crow to their animal class next year, they will surely find him a most wise and interesting pet. Crows' nests are easily located, and a young crow need not be caged.

A RED-SHOULDERED HAWK PET

This bird gained the affection of the boys at Wigwam, a mutual interest

Another black pet was discovered at Uncas and at Yawgoog. He is variously known as the skunk, sachet-pussy, polecat, in fur shops as Alaskan Sable, and often erroneously called the civet cat. However, he is not as black nor as malodorous as he is painted. He is a traveling example of what it means to get a bad reputation. The two skunks at Uncas had had their scent bags removed, but the one at Yawgoog was a complete skunk. A mother skunk and her two little

skunkies were observed nightly at Owaissa by means of flashlights from the piazza. The mother would scold and stamp with her feet, and the little fellows would hold wrestling matches and squeak with delight, accompanied by other squeals of amusement from the spectators. It is said to be great sport to take a skunk grasshoppering, which expedition would prove the real usefulness of a skunk to the community.

Without apparent reason the turtle appears to be a boys' pet, although at Serrana one little girl had brought her turtle, the size of a silver dollar, from home. There was a big snapping turtle at Timanous which was kept in a large cement aquarium made in the ground. This was a popular spot at feeding time when he received his daily meal of raw meat. At Lanakila the turtles were kept in a terrarium through which flowed water from the aquarium. The turtles had laid eggs which were being hatched in sand. The Yawgoog turtle pen, which included a section of a running brook, had all the common species of Little Rhody. On the outdoor bulletin board was posted a pamphlet from the Roger Williams Park Museum, which enabled the boys to identify each kind. Dallas Lore Sharp's *Turtle Eggs for Agassiz* is a story well worth telling about the fire of a rainy evening. The New York State Museum has just published a handbook that is of great value in this connection—*The Amphibians and Reptiles of Allegany State Park,* by Bishop.

On a field trip with Tanager Lodgers one girl spied a nest or form containing four snakelings. The children gathered them up and there proved to be three species,—a yellow-striped garter snake, a hog-nosed snake, and a water snake. It was interesting to note that although there had been but one week of camp, the children picked up the snakes without fear or prejudice. Most of the pets of Idlewild consisted of snakes. As for other pets, we found a pony at Timanous, goats at Timanous and at Neshobe, rabbits at Acadia, squirrels at Wahtonah, a woodchuck at the New York State College of Forestry Sophomore Summer Camp, raccoons at Wigwam and at Tanager Lodge, a porcupine at Timanous, and a red-shouldered hawk at Wigwam.

Only a few camps had bird feeding stations. It is true that summer is not the ideal time to attract birds, as food is so plentiful in the woods, but a little patience will be amply rewarded. Soap shakers filled with suet will attract birds to a definite place for photography, and sunflower seeds, cracked corn, buckwheat, hemp, and wheat are enjoyed by seed-eating birds. Cedar Hill Girl Scouts knit Christmas bags and fill them with seeds cooked in suet. The Kyle Camp is noted for its homing pigeons which are released on trips. The fine attributes exhibited by the birds are made use of by the directors in little talks to the campers. At Chewonki the boys utilized as a bird blind the upturned roots of a tree to which the earth was still clinging. Peek holes had been made through the clay to watch for birds visiting a drinking pool gouged out when the tree was uprooted. The inspiration that animal and bird photography brings to a camp will certainly encourage campers to study the wild life that is about them and will repay the camp directors who take the trouble actively to preserve the camp property as a wild life sanctuary for Nature's folks.

"Only God Can Make a Tree"

A number of our members have asked whether it is possible to obtain the cartoon reproduced herewith in a form suitable for posting. This demand has come from people active in school and club work who recognize the telling story of the cartoon and wish to bring it to the attention of others.

In response to this demand we have arranged for a special printing of this cartoon. It is reproduced on a good stock of paper in a size a little larger than the page size of Nature Magazine. It is specially prepared for posting purpose.

"ONLY GOD CAN MAKE A TREE!"

An order for two thousand of these posters has already been received which leaves three thousand still available. They will be sold at absolute cost, the price covering printing and mailing, in lots of not less than fifty for one dollar a hundred. Orders will be filled as long as the supply lasts.

Send your order to The American Nature Association, 1214 Sixteenth Street, Washington, D. C.

A CINDER CONE NEAR BEND, OREGON
This butte ruptured at the side, giving vent to a stream of lava which dammed the Deschutes River and formed a lake

The FORESTS and the BLACK LAVA

The Story of an Ancient Struggle between Tree and Volcano

by Walt Perry

MOUNT MULTNOMAH'S giant bulk heaved with the promise of disaster. It rumbled menacingly and finally shook the earth with a tremendous roar, its roof splitting into atoms, spewing tons upon tons of pumice and cinders for hundreds of miles around. Thus it strewed itself upon the landscape, leaving the Sisters Peaks, imposing, snow-mantled mountains themselves, but only puny hills compared to the bulk of their ancestral peak.

This is what some geologists believe happened in central Oregon, east of the Cascades at the time of, or just after, the tremendous lava flow of the Tertiary Age. On the heels of this convulsion, and for long afterwards, came minor explosions that made of this area a quagmire of heaved and heaving material. Today the fissures and faults, sunken areas and volcanic cones, give testimony of the past.

Following this period of comparative rest, the smoldering volcanic fires blazed anew and up the cindery throats of scores of these old vents surrounding the great Newberry Crater welled seething masses of frothy lava to flow down and fill the spaces and valleys between and lap upon the sides of more ancient lava streams. This action was oft repeated. So recent were the latest eruptions that these "lava rivers" as they are locally known still lie raw and black, naked and barren of all vegetation except an occasional stunted and contorted pine. Jagged and torn like an ice jam, the crust of this slowly cooling stream is no invitation to the hiker.

IN THE MIDST OF A LAVA STREAM
Desolation is made even more desolate by an occasional gnarled and stunted pine

On the older lava ridges and "buttes" heavy timber grows to the very edge of the new flow, often appearing as a green island amid a sea of chaos. During these latest eruptions there appears to have been little if any explosive action, but in many instances the unstable walls of the cinder cones were unable to withstand the lateral pressure of the full column of liquid lava. Instead of erupting at the lip of the crater the side was ruptured and the fiery stream ran free, leaving the cinder cone intact. In one such instance, midway up the steep slope of a six hundred-foot cone of red and black cinders, which had so

long been cold that it bore a forest of large pine trees, a stream of liquid lava issued and flowed to the valley below. A short distance from the vent it encountered a green pine tree three feet in diameter and enveloped it in its fiery flood to a depth of at least sixteen feet. But the molten rock flowed so freely that no great pressure was exerted on the tree and it was not uprooted. Also the green pine resisted the heat for such length of time that the lava chilled and ceased to flow before the bole of the tree was consumed, so that a perfect cast of the tree bole resulted and stands to this day a witness to the intermittent volcanic action of a past age as well as to the ages-old battle of the forests to keep the scorched and barren land clothed in green. The shell which surrounded this tree is much blackened on the inside and is much harder than the surrounding spumy lava of the main flow. This is easily accounted for by the fact that the added heat of combustion of the bark still more perfectly fused the lava, creating a rock of finer and more compact texture, better able to withstand erosion. Where air was not admitted, as in standing timber, or down logs entirely covered by the flow, this effect is not nearly so marked as in cases where one or both ends of a log protruded from the overlying molten rock. In the latter case, by the access of oxygen, the heat generated was so intense as completely to fuse the adjacent lava and cause it to run and drip like syrup, often resulting in beautiful and fantastic "chocolate candy" formations within the cast. In some instances such perfect bark casts resulted that the species of the tree is readily identifiable.

The cast we first mention now stands eight feet above the general level of the flow, and a man may descend the hollow another eight feet. How long since this death mask of the tree was made can only be conjectured, certainly many centuries at least. At any rate it seems safe to assume that all timber on the butte was killed at the time of the eruption,—if not by direct burning, then by heating of the shell of the cone. If this was so the cone, after again cooling, would have become reforested slowly by migration from the nearest living forest. At present the original cinder cone is completely clothed with a stand of mature timber, and some of these trees show ages up to four hundred and fifty years. Also these trees grow down to the very edge of the new lava stream. There is other evidence that the flow is much more than four hundred and fifty years old.

TIMBER GROWS TO THE EDGE

On the older lava flows forests stand at the edge of the newer flow, having fought and won

NO, NOT A CAVE INTERIOR

This is the inside of a log cast which burned with ventilation causing the lava to drip

Beyond the lava flows, in the "High Desert", we can pick up fragments of various species of wood that was bedded down and turned to solid stone with the bones of long extinct animals which roamed this country millions of years ago. Sometimes we can even determine the species, and always we are inclined almost to speak in whispers of these in veneration of the awesome age. But even these, though incomparably older, do not seem to carry the interest, to make the same strong appeal to the imagination, to teach the lesson and demonstrate so forcibly and at first hand, as it were, Nature's unswerving design to perpetuate her forests as does this single stony death mask of a tree, even now shadowed by specimens of its own species which are running their roots into the new lava flow.

Certainly it is the popular impression that a stream of rock so hot as to flow freely for miles must utterly destroy all organic matter in its path almost instantly. This we see is not true. A few miles from the tree cast described, lying between eminences of older volcanic rock, is a valley down

which has swept successive flows of lava, the last three of which may be examined at the surface. The older of these, the third stratum, lay so long undisturbed that a rich though thin layer of soil accumulated and it bore many trees up to four feet or more in diameter and of good height,—a forest. Much time,—several tree generations,—must have elapsed during this period in order that such an amount of productive soil could accumulate. Then welled up from a great fissure, connected with the internal fires of Newberry Crater, a flood of molten material which covered the valley to a depth of ten to twenty feet. The forest was overwhelmed. Owing to the shallowness of the soil the great trees had sent out tremendous lateral root systems to make good the lack of depth and grip on the underlying rock which they could not penetrate. Many of these large roots showed to the surface for thirty to fifty feet. As the moving lava reached these trees many were borne down and twisted loose from their roots, though scores of them remained standing and died, facing the enemy. Here may be seen many casts of standing trees; of great trees that fell in that combined attack of fire and the very earth itself. The very thickness of the timber here impeded the lava and caused it to bank up and, after the next flow, to appear as an island of older material. On this island among tombstones of their ancestors are now standing trees near five feet in diameter. The succeeding lava flows each destroyed its crop of timber and left the usual signs, and, though the island was not again covered, there seems to have been an intrusion of lava beneath it and many fissures were formed when the surface heaved and buckled.

THE THREE SISTERS PEAKS

Snow-mantled, they stand as reminders of their ancient ancestor, Mount Multnomah

Lower down this stream, in the newer lava, probably six hundred years ago, a seed of the western white pine accidentally found lodgement and germinated. What an inhospitable site for tree growth this must have been at that time! It seems probable that this tree was one of Nature's first attempts to reforest after the last flow. The tree now lies,—and for twice the age of a man has lain,—on the black and barren rocks, rotted entirely off at the stump and hollowed to a mere thin shell of resinous material. Hardly is it to be recognized as a tree at all. And it fell not as a tree should fall,—crashing across the rocks and splintering into fragments,—rather it seems to have crouched down amongst the black lava even as some monstrous animal of the ancient world might have done.

But this old pioneer did nobly. It endured to the end; endured while twenty generations of men were born and died! On its one little spot in the black lava it shed countless millions of needles, bark, twigs and cones, and at last the very substance of its body, to be sifted down through the broken rock and furnish food for the roots of another tree. Thus after many generations the trees will have crept in from either side until they meet in the middle of the valley; the loose rocks will have become filled up and covered over by humus and then no longer will it be the "black lava".

Each of these lava streams destroyed a strip of forest and rendered the land sterile. Nature, after centuries, reforested, first on the soil, and, centuries later, on the lava. Civilized man's need for the forest did not exist on this continent at that time,—nor would Nature have retarded or speeded up her processes by so much as a split second if it had! It is enough that man found the forest ready to serve his needs when they did arise, and that he can, if he will, continue to enjoy the full benefits of it without wantonly destroying it.

THE DEATH MASK OF A TREE

Cast in the lava standing eight feet above the surrounding surface and extending eight feet below

BASSO PROFUNDO AND HIS TUNEFUL NECKLACE

BASSO PROFUNDO

The Story of a Remarkable Frog and Friendship

by Marjorie Shanafelt

Who hasn't listened to frogs croaking at dusk, big frogs, little frogs, middle-sized frogs? Who hasn't loved to stroll around the edge of a pond for the fun of hearing them go plop, plop into the quiet water, and to catch glimpses of long, green legs flashing in the sunlight. Do frogs know that two-legged beings are fond of sitting down at white clothed tables to delectably fried frog-legs? Is that the reason they jump so quickly as we pass by? At any rate, who ever heard of a bullfrog coming to sit on anybody's knee? Yet, that is exactly what Basso Profundo did every summer day.

He lived in the shady pool at the end of a little path that scurried down the hill from the house where three children lived. These children were Wendel-the-Eldest, Joan-the-Youngest, and Miles-the-In-Between. It was their mother who named the frog Basso Profundo, because his voice was the biggest and deepest of any frog in the pond and she said that was just what Basso Profundo meant. The children thought the pond in which Basso Profundo lived looked like the bottoms of their mother's stew pans, so smoothly, softly gray it was. There was an old log sticking its back out of the water and on this one could find Basso Profundo almost any time one chose to look. Not only Basso Profundo but a lot of other froggies, so that Joan-the-Youngest was sure he was their schoolmaster in his out-of-door schoolroom and sang gaily from the bank,

"Twenty froggies went to school,
Down beside a rushy pool."

It really seemed as though Joan were correct for whatever Basso Profundo did, so did the froggies. Did Basso Profundo snap at a fly, every froggie snapped his wide mouth whether there was a fly near the end of his silly nose or not. Did Basso Profundo jump kersplash into the dreamy water, so did every other froggie.

Just why the ridiculous noise that Wendel-the-Eldest made by means of his cupped hands and a willing tongue should be the signal to attract Basso Profundo's attention, nobody can say. At any rate, Basso Profundo would sit on his log, blinking his black eyes, in the midst of all the froggies who were blinking theirs, until Wendel's call would come from the shore, when, with a flip of his long legs, he would be in the water and swimming towards the shore. He would look back now and then, at the froggies and utter a throaty "chug, chug" as though telling them that in this instance they were not to copy him lest disaster befall them and they turn into crisply-browned frog legs on a dinner plate. If Wendel stopped his calls Basso Profundo stopped too. If Wendel waited too long Basso Profundo started back towards his log, but eventually reached that spot where the ripples lapped the bank. There he would pause, looking up at them from the edge of the water with his big eyes that looked like black glass with lanterns behind them. Having had his mind made up all the time, he would suddenly give a curving leap and be on the bank beside them, his jacket a charming green in the mellow light.

Miles-the-In-Between never forgot the dish of meat tidbits, frog size, with which to reward Basso Profundo. He was such a bow-legged, such a wide-mouthed, such an ever-hungry frog. Sitting on a knee his front feet looked like a baby's wide-spread hands, but it was his great webbed hind feet which were most in evidence. Joan-the-Youngest carried a blue satin ribbon in her apron's diminutive pocket. As soon as Basso Profundo drew near she got out the ribbon and slipped it over his head and around his pudgy neck. There were little bells on the ribbon and when Basso Profundo snapped at the bites of meat the bells went jingle, jingle. Seriously he hopped from one child to the other, accepting a bite from each. The dish sat in the center of the triangle they made but his manners were perfect for he pretended not to know that he could so demean himself as to gobble the whole banquet at once. So quickly did Basso Profundo's tongue sweep in the tidbits that it was difficult to see what happened, but Joan would have told you

that his spongy-looking tongue was fastened to the front of his mouth instead of to the back as are the tongues of people. So when Basso Profundo saw a fly he opened his mouth and his tongue turned a somersault, as it were. It was the back edge of his darting tongue that touched the bit of meat, or an unlucky fly, and because his tongue was always sticky there was no escape for any hapless fly it touched. To see that tongue flashing out never failed to send the children into gales of delighted laughter.

Sometimes he tarried after the meat was gone, basking in the sun, his broad throat pumping up and down. Oftenest he didn't wait to say "thank you" but as soon as he was sure the meat was all eaten made a great leap back into the pond. For a moment there was nothing to see but a few ripples and a floating ribbon. Joan would have cried her eyes out if she hadn't the ribbon to carry about with her in her apron pocket, so Wendel kept a long stick handy and fished it out, a bit wet but perfectly satisfactory. A few moments later one flash after another announced that Basso Profundo and his froggies were back on the mossy log.

I am not saying how long it took to get Basso Profundo to trust himself to the children, but you may well believe it was many, many days. It was the meat that did it of course, tasty bites on the end of a dropped string that coaxed him closer and closer to the bank, up and up the slope, and nearer and nearer the children who held their breath in order not to frighten him away. Still, we like to feel that friendship and confidence had their part, also.

Basso Profundo is probably the only frog in the world who has been remembered in anybody's prayers. Every night sleepy Joan ended her prayers with "God bless Basso Profundo and keep him safe from frying pans for ever and ever, Amen".

THIS is a picture of a harp but if you look closely you will discover a young lady hiding behind it. She is Marjorie Shanafelt, author of this and other charming articles in NATURE MAGAZINE. *She is Curator of Visual Education at the State Museum at the University of Nebraska, Lincoln. As one gathers from the picture, however, her avocation is as a harpist. She has played for about twelve years, having studied with Miss Thurston of Chicago, and Salvi.*

Miss Shanafelt confesses that she never left city streets and third floor apartments until she was eighteen, and had never seen any wild animals. Then she went hunting tiger beetles with a friend one day and has been busy making up for lost time ever since.

THE ANGLER

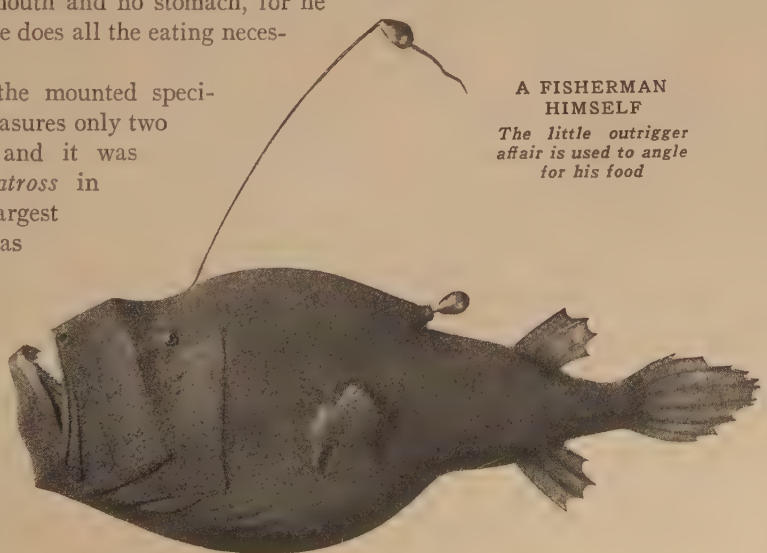
by James N. Miller

IN THIS angler, deep sea fish extraordinary, science has proved the truth of the timeworn adage, "the female of the species is more deadly than the male." For the male angler is a poor specimen, to say the very least. Not only is he absolutely dependent on the female for food, but he actually grows fast to her side, being connected to her very blood system. Being such a lowly parasite, he has no mouth and no stomach, for he needs none, as his wife does all the eating necessary for both.

The original of the mounted specimen pictured here measures only two and a half inches and it was caught by the *Albatross* in deep water. The largest ever brought up was only about forty inches long. Of the two hundred and twenty collected by the Dana expedition in 1920-22, half of the anglers measured no more than an inch.

The name, angler, comes from the fact that the fish is supposed to angle for its food very much as we do. The curious long tentacle at the top of the head is the lure with which it entices its prey within striking distance. Thereupon, the sea devil, as it sometimes is called, opens its cavernous mouth and in goes the fish.

It is interesting to compare this angler, found between five hundred and fifteen hundred fathoms, with its shallow water cousin, the common goose fish. Likewise a fisherman of expert ability, the goose fish usually is some three to four feet long and weighs up to forty five pounds. However, it commonly is brown, whereas the deep sea angler is black and sometimes has luminous markings on it. Frequently the luminosity is on the angling apparatus, sometimes on the roof of the mouth.



A FISHERMAN HIMSELF

The little outrigger affair is used to angle for his food

"THE SEVEN CLOSED THEIR SHORT PINIONS AND SHOT DOWNWARD"

A TRAGEDY of the MARSHES

A Story of Winter's Betrayal and the Havoc it Wrought

by Lee S. Crandall

of the New York Zoological Park

Illustrated by R. Bruce Horsfall

THE SUMMER in the marshes of Saskatchewan had been a wet one, and the water plants had grown luxuriantly. The flocks of wild fowl had fed fatly on the succulent wild rice and arrow-head, storing up thick layers of potential energy with the happy faculty with which Nature guards against the possibilities of a lean winter. Fall had come, and the restless hosts were feeling the compelling lure of the southland. Flocks of mallards and teal swung like fleeting shadows over the wide treeless expanse; groups of scaup and redheads puddled half-heartedly in the shallow water, taking an uncommonly small interest in their feeding. The signal had not yet been given, but all were in readiness.

Towards evening of a bleak November day seven swift-winged ducks circled over the marsh, seeking a safe landing for the night. Their passing called forth a clanging chorus from the watchful female mallards, but those hoarse sirens had no seductive powers for such as these. Selecting a quiet pool, aloof from the noisy rabble, the seven closed their short pinions and shot downward, catching themselves in time to slide into the water with much splashing, feet stiffly extended. Handsome birds were these, the slender, brick-red heads rising gracefully from the gray-white backs of the males, proclaiming them the aristocrats of the wild flocks,—canvasbacks. An instant's wary inspection, a short period of dipping and wing-flapping, and the little group fell to feeding with a feeling as nearly akin to that of safety as they may ever be permitted to enjoy. Yet never were all heads under water at once. Never was the watchful vigilance relaxed, for safety is oft fleeting.

Something in the bearing of these birds bespoke superiority. Silent, alert, their diving was not punctuated by the babble of sounds as from the gabbling swarms of coarser ducks. One might almost gather something of the past history of this glorious species—of days not long past when its thousands dotted the marshes for uncounted miles—when the passing flocks grayed the sky in feathered clouds. They were equally silent even then, save for the protesting whistle of air forced between the spreading pinions. Birds are low in the scale of life, barely rising above the cold-blooded snakes and lizards; the action of their brains does not involve more exertion than will carry the individual from the dangers of one day to those of the next. But the whole nature of the canvasback duck wonderfully befits a bird whose numbers have been reduced from myriads to a pitiful few, struggling for bare existence! Yearly slain in thousands, by the many hunters of Currituck Sound and other southern waters, the breeding grounds in the prairies becoming more and more constricted by the extending network of drainage systems, the canvasback must soon become a creature of the past—a companion of the great auk and the passenger pigeon, the Carolina parrakeet, and the whooping crane.

Having satisfied the hunger born of the long journey from their summer home farther north, the birds were composing themselves for sleep. Not, however, as the uninitiated might expect, by making their way ashore. Long experience had taught them that in no place on

land were they safe from marauding enemies. Only when on the water, with a wide expanse intervening between them and nocturnal prowlers, were they content to indulge in fitful napping, and it is thus they passed the night, the dark waters of the lake serving as a bed.

With the coming of dawn a subtle change was evident in the marshes. The indecision of yesterday was gone; the atmosphere tingled with the expectancy of impending action. All of the feathered inhabitants of the swamps sensed the mysterious command which named this as the day for another southward move, and already many were obeying it. Flock after flock rose from the steaming mass of reeds and grasses, each to take its place in the kaleidoscopic stream that surged on whistling wings towards warmer climes.

"A LONE HERRING GULL PULLED AT A BEDRAGGLED BUNCH OF FEATHERS"

All unwearied from their journey of the preceding day, our little group of canvasbacks, having fortified themselves with tender roots from the bottom of the pool, whirled upward amid a loud farewell from loitering mallards. Disdaining the company of meaner relatives, they held unswerving to their course, stopping only when hunger called. Soon their eyes were gladdened by the welcome sparkle of distant water directly in their line of flight,—the Finger Lakes of central New York. Traveling at high speed, the seven quickly dropped among a small assemblage of their kind. Little heed was given to their coming,—canvasbacks are not demonstrative birds, even as ducks go, and of what account are seven? Time was when seven hundred would not have named the total count of the flock which gathered there.

"ONE SMALL PATCH ALONE REMAINED FREE OF ICE"

Left among the rolling hills by the reluctant retreat of the ice sheet of glacial times, the hospitable Finger Lakes have been a winter haven for the wild flocks from times beyond the ken of man. Protected from the icy blasts of the north, their clear waters were frozen over but once in a decade. Few birds among the present great assemblage had lived enough years to recall the dire experiences of the last betrayal, and ensuing years of warmth and plenty had dimmed their sluggish memories. Why should they not enjoy the abundant food and comfortable shelter which had been theirs in previous years? Weeks passed, as weeks will, each filled with days of ease and plenty. Loons and grebes flashed beneath the dancing water in swift pursuit of elusive minnows; ducks dabbled among the thickly-growing plants or sought crustaceans and insect larvae in the darker regions below the surface.

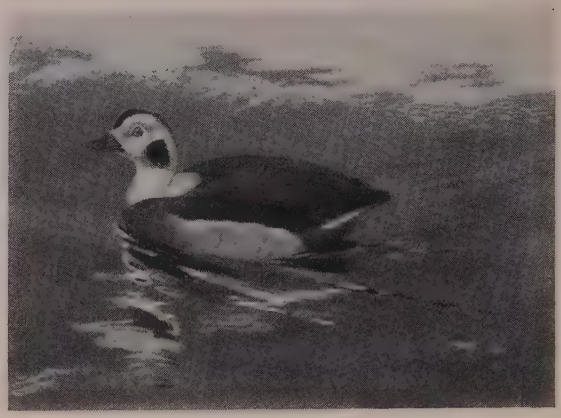
Thus autumn aged to winter. Then came the snow, soft and silent, levelling the knolls and gullies with the deadly patience which only the elements possess. For two days and a night it fell, unceasingly, but its coming did not affect the birds on the lake. True, many an isthmus and promontory of glistening crystals formed along the shore, wherever the tussocks of wiry marsh grass gave a footing, or where a thin coating of ice bridged a narrow channel. The great body of the lake was still open.

Towards evening of the second day, came a presage of disaster. The temperature was falling. By nightfall it had dropped to zero; by midnight, fifteen degrees below. We cannot know all that happened during those hours of terror, but dawn revealed the tragedy. The lake had frozen over—covered by a crust too thick to be broken by the weight of a bird's body or by the pressure of its breast at the edge of open water. One small patch alone remained free of ice. This was an inlet from the main lake to a tiny harbor, the shifting currents between the two keeping the water in constant motion. Here had gathered hundreds of ducks — canvasbacks, scaup, golden-eyes, blacks, and a single old squaw, a sea duck with the agility in the pursuit of minnows nearly equal to that of the grebes. The latter, with the loons, had risen while there still remained open space sufficient for their flapping start, and blundered off on weak wings in search of safer water. The loons, being more powerful fliers, succeeded fairly well in their quest; but the grebes, specialized for diving at the expense of flight power, confused and exhausted, dropped to earth wherever fatigue overtook them. Unable to rise except from the element to which adaptation had fitted them, they floundered helplessly in the deep snow until overcome by the cold or granted a swifter end by prowling cat or fox.

But the instincts of the canvasbacks are not those of the grebes. The latter are restless creatures at best, here one day and gone the next, each independent of his fellows. The ducks, however, were bound by flock laws. This had been their winter home for years; they would not leave it now because of a condition which they had never before experienced.

Crowded between the narrow limits of the channel, the ducks soon felt the need of food and speedily demolished the scanty supply of plants available. There

was barely sufficient for one day's sustenance, and the birds were forced at once to draw upon the store of fat laid by during the season of plenty. This, however, was not great enough, unaided, to maintain their strength for more than a few days, and the thick layers beneath their skins were soon exhausted. Unable to secure further nourishment, lacking the initiative to take wing in search of it, the flock faced certain starvation in no short time.



"NONE REMAINED EXCEPT THE OLD SQUAW, FORTIFIED BY MINNOWS"

A week passed, and their number had been reduced by half; of the remainder, only the single old-squaw, pursuing her minnows beneath the ice, seemed capable of longer endurance. Flocks of herring gulls hovered, vulture-like, over the frozen lake, waiting for the feast which must be theirs.

A few days and the tragedy had been completed. Of all the hundreds of splendid birds, none remained except the old-squaw, fortified by minnows, impervious to cold. Far out upon the ice, a lone herring gull pulled ghoulishly at a bedraggled bunch of feathers, the reward of his patient waiting.

Thus are the ranks of a vanishing race reduced. What miracle can restore them? What chance is theirs to gain their former numbers if man and winter so conspire?

MEET MACROPHYLLA

by Adele Seyle

WHILE driving through Louisiana our attention was attracted to some small trees, with immense leaves. Light green on top, grayish-white underneath, very tender. No one of the party could name the tree, but one thought that when it bloomed there was a "large white flower like a magnolia." We then began to notice the full grown trees and soon, by very carefully observing, were able to see some full-blown blossoms very high, near the tops. These blossoms were particularly difficult to locate, each being protected by a circle of the immense leaves, the underside of which, being gray-white, made it hard to distinguish blossoms from leaves. We were immediately fascinated with the mere prospect of securing one or two blossoms, and began to plan toward that end. The chauffeur was soon climbing, and secured four. The writer, turning off in another direction from the party, was rewarded by the discovery of a tree which, unlike the others, had a low branch, containing a large flower and a bud, which was easily removed without the aid of scissors or knife, being very brittle and breaking off evenly and clean.

The texture of the flower petals and their odor is identical with that of the magnolia most commonly known in these parts, but there is no similarity whatever in the leaves of the tree, or its formation. This tree has a height of about seventy-five to eighty-five feet, the branches all very high. The diameter of the trunk is about twenty inches, the bark is pale and thin, nearly smooth, and the twigs round, smooth with greenish gray bark. Within the stem of the twig is an inner part of pithy, pulpy, yellowish white substance, encased in this thin outer circle of bark.

A SPECTACULAR MAGNOLIA

A study in black and white of the large-leaved umbrella tree

The leaves of the tree measure around twenty-five inches from stalk to tip, and the tips are blunt, or blunt pointed, the upper surface light green and smooth. The under part is grayish-white, velvety or almost hairy, particularly with the younger leaves. There is a very prominent underrib and the broadest part of a leaf measures at least ten inches.

The creamy white and very fragrant flowers consist of six petals, all blunt pointed, with three broad and three narrower. The broad ones are the outer and the narrower ones are the inner circle of the flower, which, when fully opened, measures at least twelve inches across. A single petal is ten inches from base to tip, and the bases of the broader petals are splashed with a rosy purple.

This interesting plant is *Magnolia macrophylla,* the large-leaved umbrella tree.

TO USE, HOLD OVER THE HEAD WITH TOP TOWARD THE NORTH

This map is designed for use March 1, 9 p. m.; March 15, 8 p. m.; March 31, 7 p. m.

The ZODIAC *or* CIRCLE *of* ANIMALS

The Constellations which Harbor the Sun, Moon and Planets

by Isabel M. Lewis

EVERY star gazer should be as familiar with the constellations of the Zodiac as he is with the well-known groups of the far northern heavens, the Big Dipper and Cassiopeia. Once learned they serve as starting points for locating other less famous or less conspicuous groups of stars. Then, too, the Zodiac and its constellations have a special importance and significance that distinguishes them from other groups of stars. The Zodiac we define as a belt, or zone of the heavens extending eight degrees on either side of the ecliptic, which is the apparent yearly path of the sun among the stars. It is made up of twelve constellations, eleven of which are named for living beings. The twelfth constellation, Libra, The Scales, is of much later origin than the others and was formed from a portion of the constellation of Scorpio that was formerly occupied by the creature's claws. These, as one ancient astronomer put it, were drawn in to make room for the new constellation. The word Zodiac comes from the Greek and means "Circle of Animals."

If we begin with the vernal equinox, which is the point where the ecliptic crosses the celestial equator, and follow the course of the sun eastward along the ecliptic during the year we find that it passes in order through the constellations of Pisces, The Fishes; Aries, The Ram; Taurus, The Bull; Gemini, The Twins; Cancer, The Crab; Leo, The Lion; Virgo, The Virgin; Libra, The Scales; Scorpio, The Scorpion; Sagittarius, The Archer; Capricornus, The Sea-Goat, and Aquarius, The Water-Bearer. These are the twelve constellations of the Zodiac and, as we will soon see, there are also twelve "Signs of the Zodiac" bearing the same names as the constellations of the Zodiac but not coinciding in their position with the groups for which they are named.

At the beginning of spring the sun is always at the vernal equinox, and as the vernal equinox is the point where the ecliptic intersects the celestial equator, the sun is then "on the equator".

If we lived at the equator we would find that when the sun is at the vernal equinox at the beginning of spring it passes directly overhead or through the zenith. During the next three months we find the sun "coming north," as we say, though actually what happens is that the Northern Hemisphere is then tipped toward the sun so that the sun *appears* to come north.

In this period the sun passes in turn through Pisces, Aries and Taurus and at the beginning of summer, on June 21, it is in the constellation of Gemini and then is farthest north. During the three following summer months it is going southward toward the equator once more, and passes in turn through Gemini, Cancer and Leo and at the beginning of autumn is once more on the equator at the autumnal equinox in the constellation of Virgo, but now it is going south instead of north. So it is the Southern Hemisphere that will be tipped toward the sun during the next six months and will have spring and summer while the Northern Hemisphere is having autumn and winter.

After crossing the equator once more at the autumnal equinox the sun passes in turn through the constellations of Virgo, Libra and Scorpio and on December 22, when winter begins in our hemisphere and summer in the Southern Hemisphere, it is farthest south in the constellation of Sagittarius. During the next three months it is coming north once more passing in turn through Sagittarius, Capricornus and Aquarius and on March 20, at the beginning of spring, it is again at the vernal equinox and has completed one yearly circuit of the heavens through the constellations of the Zodiac.

There are twelve signs, as well as twelve constellations of the Zodiac, which bear the same names as the twelve constellations but do not coincide with them in position. About 2000 years ago, as it happened, the astronomer Hipparchus divided the Zodiac, or Ecliptic Circle, into twelve signs or divisions, each extending thirty degrees along the ecliptic. The sun passed in succession through these signs each one of which defined the position of the sun during one solar month. It happened that the vernal equinox, which Hipparchus took as the starting point for his divisions of the zodiacal belt, is not a fixed point but is slowly shifting westward along the celestial equator at the rate of about thirty degrees in 2000 years. This westward motion of the equinoxes is known as the "Precession of the Equinoxes" and as a result of it the constellations of the Zodiac are continually changing their positions with respect to the vernal equinox. In the days of Hipparchus the vernal equinox was in Aries at the beginning of spring and it was also in the Sign of Aries which was the first of the Signs of the Zodiac, starting from the vernal equinox. In fact the vernal equinox was then called The First Point in Aries, a name which it still holds though it is no longer in Aries but in Pisces, the next constellation to Aries on the west. All the signs of the Zodiac have backed around into the constellations lying next to them on the west and though the sun is said, for example, to enter the Sign of Cancer at the beginning of summer it is no longer in the constellation of Cancer when that season begins but in Gemini, the constellation next to it on the west. After a lapse of about 25,800 years the equinoxes complete the entire circuit of the heavens and have passed in turn through each of the zodiacal constellations.

BACHRACH

MRS. ISABEL M. LEWIS is well-known, by name at least, to all the astronomically-minded readers of Nature Magazine. We have the privilege of knowing her personally, and can testify that beside her capabilities, she is a most charming lady.

Mrs. Lewis is a graduate of Cornell, a native of Maine and an adopted daughter of Washington, D. C. She worked with Simon Newcomb in his studies of the motion of the moon and with the U. S. Naval Observatory. Her husband, Clifford S. Lewis, who recently passed away, was also an astronomer. Mrs. Lewis was recently left a large legacy by a relative, enabling her to send her son to Cornell, as she has always desired

Not only the sun but also the moon and planets are always to be found among the constellations of the Zodiac for their orbits lie close to the plane of the ecliptic. So if we know the constellations of the Zodiac we know where, and where only, to look for the planets. Most of the zodiacal groups we should know well by this time for we have taken them up in detail in past numbers of Nature Magazine, but in an early number will be shown a representation of the Zodiacal Circle and some of its interesting features.

If we look at our chart for this month we find that the zodiacal constellations plainly in view this month in the evening include Taurus and Gemini in the west, Cancer and Leo in the east, with Virgo rising in the east. Also at the beginning of March this year the moon will be found in the constellation of Gemini and at the First Quarter. It will be interesting to trace its eastward course during the first week of March from Gemini through Cancer and Leo to Virgo, where it will be found at the time of Full Moon on March 6. At the same time we will be tracing the path of the portion of the Zodiac now visible in the March evening sky.

The planet Jupiter is still the only planet visible in the evening sky and is now in the constellation of Pisces and so near the sun that it may be seen only in the earlier part of the month low in the west after sunset. By the end of the month it will be too close to the sun to be seen, so its position is not shown on the chart of the heavens for this month. Saturn now rises about midnight and is a fine Morning Star in Scorpio. Venus is drawing in toward the sun and is not as well placed for observation as it has been during the winter. Mars is now in the constellation of Capricornus and may be seen in the

southeastern sky before sunrise. On March 22 the planet Mercury will reach its greatest western elongation, but it is not very well placed for observation at this time as it is low in the southeast at sunrise.

Spring will begin this month on March 20 at 3:45 P.M., Eastern Time. As we have seen, the time when spring begins is a very definite moment, for it represents the time of passing of the sun through the vernal equinox, the point where the ecliptic crosses the equator. The sun then "crosses the equator" in other words and the great circle that separates the day and night sides of the earth passes through the poles and day and night are equal in length all over the world. This year at the beginning of spring the sun will be directly in the zenith at a point on the equator in longitude 131 degrees 45 minutes west of Greenwich. After the beginning of spring the days will become increasingly longer than the nights in the Northern Hemisphere, and vice versa in the Southern Hemisphere, as the sun increases its distance north of the equator. Thus we are given the seasons.

How Wonderful Are Thy Works!

by Beatrice B. Bell

To build as perfectly and with as much ease as the spider, that would be an achievement worth while. All the products of her loom, from the suspension bridge to the elaborate egg sac are wonderful, but as a work of art, the symmetrical web takes first place. Patience and persistence are necessary if one wishes to watch a web in the making, for the spiders are wary and do most of their work in the night. Only the very young spiders work by daylight, and they get busy but a short time before sunset. Their work is just as perfect as the old timers' but is much more delicate, their webs being too fine to withstand the shock of the struggling prey. Hence they build anew every day. But, young or old, the system is the same.

After selecting a likely spot for the food trap, the spider runs about from branch to branch with apparent unconcern, leaving a web wherever she goes. But she really has a system, and this aimless wandering results in a scaffolding to assist in the construction of the real web. A long thread appears running across the framework and at its center is a tiny silk cushion, this cushion becoming the center of the web. Starting from the cushion the spider runs to some place near the edge of the framework and back again. This is done several times and on each trip a radius is laid. A few radii are then made on the opposite side, thus equalizing the strain and keeping a balance. Each time at the center, the spider gathers up any slack there may be and fastens it to the little cushion. In a very short time the "spokes" of the wheel are finished, and as far as the eye can see, they are equidistant and form a beautifully regular orb. Marvelous indeed!

The next step is the spiral. First, a temporary spiral is made. Starting from the center, the spider goes around and around fastening her thread at each spoke. This temporary spiral becomes a means of support where the radii are too far apart for a suitable footing. Now, beginning at the outside, the spider proceeds to make the real net, this last spiral being of different material from the other threads. It is sticky and bids fair to hold fast to whatever fate brings along. Going from spoke to spoke, the spider lays her snaring web, fastening it firmly at each intersection. As the first spiral becomes useless, having served its purpose, she gathers it up and fastens it at the next contact point. Round and round she goes, the circles growing continually smaller, until at last the little center cushion is reached and the web is done. It takes from half an hour to an hour to make this spiral. The banded and angular Epeira make about thirty spiral circles, and the silky Epeira, around fifty. There is also a characteristic number of spokes which varies but little; the angular Epeira placing twenty-one in her web, the banded, thirty-two, and the silky, forty-two. Such is the precision with which the work is done. Well may we say,—"How wonderful are thy works!"

THE EVER-WONDERFUL WEB

Patience to watch this achievement is amply rewarded by the beauty of its accomplishment

HINTS AND HELPS FOR *HOME and GARDEN*

MARCH

by

Thomas Sheward

FINISH all planting and pruning early this month in all except very northern states.

* * *

Replant the herbaceous border, if necessary, and uncover beds of bulbs, in northern states, where they have been protected with leaves during the winter.

* * *

New lawns can now be made, and old ones renovated. It is a good plan to go over the lawn with a rake, and scratch up the soil, this month, then give a dressing of bone dust, or soot and wood ashes, mixed with fine soil. After the first rain, go over the lawn with a roller and if any reseeding is necessary, attend to it now.

* * *

The object of this department is service to our readers. In order that it may fulfill this aim, we would appreciate any expressions of opinion as to how well it is now serving and any suggestions for its improvement or change

Hotbeds will now be started for all kinds of half hardy flowers and vegetables. Asters, stocks, zinnias, petunias, and other bedding plants are now sown in the hotbed, to make strong plants for setting out in May.

* * *

Any house plants that require repotting, should now be attended to. For foliage plants, such as ferns and begonias, a soil composed of half peat, half loam, is best, and light potting. Most flowering plants do best in plain loam, and should be potted firmly. Soot will improve ferns and many foliage plants, producing rich dark green foliage.

* * *

Soot water given to ferns at this season, as the new fronds are forming, is very beneficial. It is made by placing a bag of soot in the watering can, and shaking it around till the water becomes dark, then it is given to the plants every few days.

* * *

In the northern states early peas, parsnips, radishes, spinach, and early turnips can be sown, in the south tender vegetables, such as melons, okra, eggplant and sweet potatoes can be planted. On the Pacific coast in Washington and Oregon all kinds of vegetables will be planted this month, and new plantations made of rhubarb, asparagus and strawberries.

* * *

This is the month for grafting over trees to new varieties. Split grafting is generally practiced on large branches, saddle grafting on small twigs about the size of a lead pencil. In grafting, new wood is chosen from the top of bearing trees, top wood making best scions. This is cut into pieces, about six inches long, made wedge-shaped at one end, so that when the cleft is opened with the grafting knife, it fits tightly into it. To be successful, the bark of stock and scion is placed in contact, as illustrated, and then waxed over.

* * *

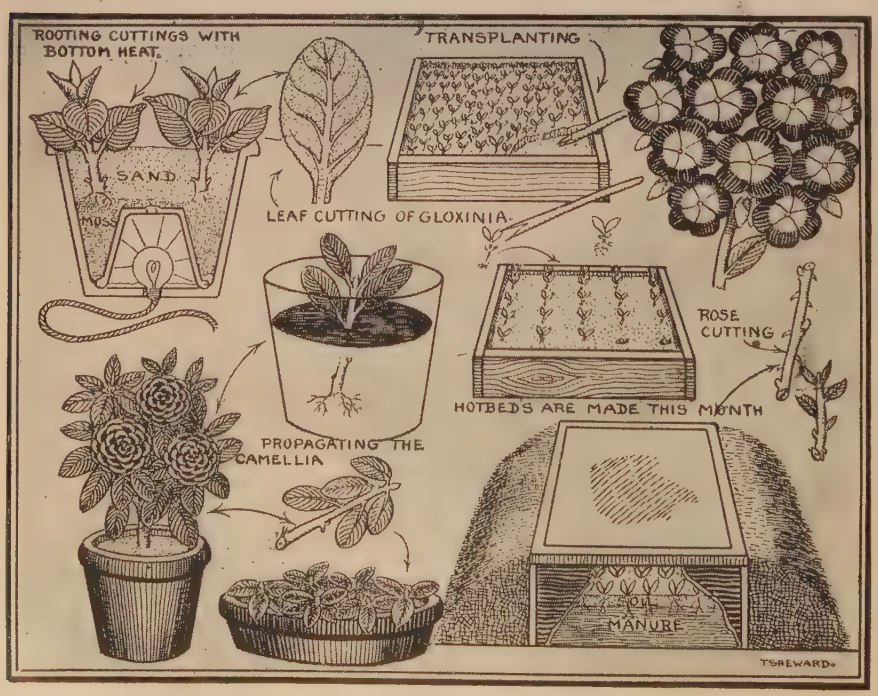
Rubber plants that are too tall can now be air-layered, as illustrated. Two cuts are made in the stem, where roots are desired, and then wet moss is tied around. Roots start at the cut, and when the moss is full, the top is cut away, and planted in a pot, the old plant afterwards forming a new top, that can also be layered, if more young plants are required.

* * *

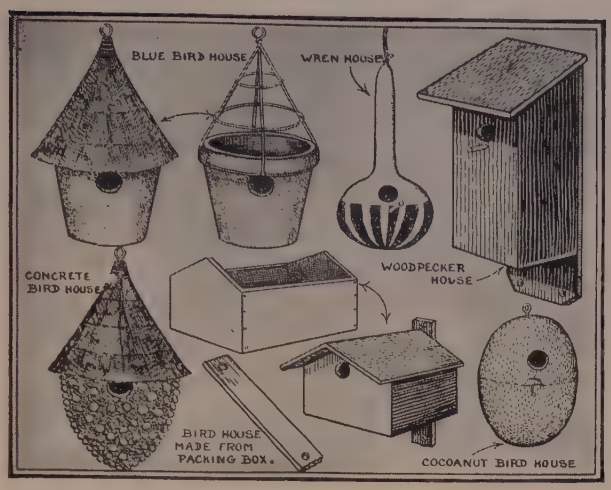
Cyclamen plants will now be at their best in the window garden, and as the flowers die away seed pods will be forming. If these are saved, and planted, new plants will be produced, to flower next year.

* * *

Water lilies will soon be start-



ing into growth, and if any of the old roots are to be divided, this is the best time to do it. A small piece of root, planted in a pot or rough wire basket, in rich soil, will give quite a quantity of flowers during the summer. The illustration shows how to make a small lily pool with a half cask sunk into the ground, and stones placed around the edges. Behind these are planted cerastum, arabis, or nepeta, so that they grow over the edge, and create a very pretty effect, and add to the garden.



* * *

Cuttings of all kinds root easily now. Many cuttings root best in water. Camellia cuttings can be rooted this way, taken from the new wood, as illustrated. Root cuttings of roses in the window gardens or hotbed. They root easily now. A good way to root cuttings in the window garden is to supply bottom heat by placing a small electric light bulb in a flower pot, as illustrated. This is covered with a small pot, cemented firmly to the bottom of the cutting pot, and when the heat is turned on, the sand becomes warm, so that cuttings root quickly.

* * *

Leaf cuttings of begonias and gloxinias root easily when treated this way. Phlox can be propagated now, from cuttings, on a mild hotbed. Primulas for the window garden next winter are sown this month. It is a good plan to cover the seed with a light sprinkling of dried sphagnum moss, passed through a fine sieve, as this holds moisture, and helps germination. Sphagnum moss is also useful when transplanting the seedlings. They lift with little mats of roots and soon get over the transplanting. Fine seedlings are best treated this way.

* * *

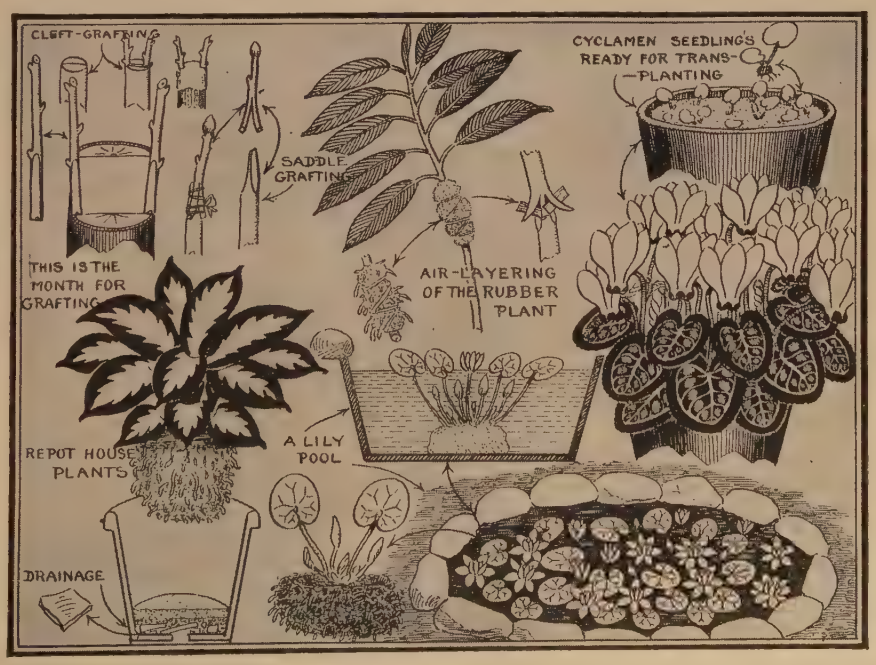
Many birds are very useful in the garden for destroying grubs and insects, and the best way to encourage them, is to place nesting boxes in the trees. The illustration shows a few simple bird houses made from packing boxes, flower pots and gourds. The concrete house is made by covering a flower pot with paper, and building over it with cement. It is thatched with cedar bark, or straw bottle protectors, and suspended in the garden. This is a good time to place bird boxes.

* * *

In planning one's garden and considering the flowers to be planted in it, color is a question that should be carefully studied. This should not only be from the point of view of the particular colors of flowers selected but also from the standpoint of their blooming time. These two considerations are essential to a pre-vision of what the combination of colors will be in your garden.

Such data are frequently obtainable from nursery catalogs and from garden charts. To give an idea of what points should be considered we will reproduce herewith a small part of a garden chart. It will give a suggestion as to how other flowers, not mentioned here, should be studied. The letters P, B, and A stand for perennial, biennial and annual plants, and the rest of the classification provides an idea of what the plants are like in color and size and when they can be expected to bloom as a part of the garden color scheme.

NAME	TYPE	COLOR	HEIGHT	SEASON
Alyssum	A	White	6 in.	June-Oct.
Anemone	P	White, pink	2-3 ft.	Sept.
Candytuft	A	White, pink	12 in.	June
Candytuft	P	White	9 in.	May-June
Columbine	P	All colors	2-3 ft.	May-June
Coreopsis	P	Yellow	2-3 ft.	June-Oct.
Chrysanthemum	P	All colors	3 ft.	Oct.
Daisy, English	B	White, pink	6 in.	May
Delphinium	P	Blue	3-6 ft.	June
Delphinium	A	Blue, pink, lilac	18 in.	July
Foxglove	B	White, pink	5 ft.	June
Hollyhock	P	All colors	6 ft.	July
Iris	P	All colors	2 ft.	May-June
Lupine	P	Blue, pink, white	3-5 ft.	May-June
Monkshood	P	Blue	3 ft.	August
Nasturtium	A	Yellow, orange	12 in.	June-Oct.
Peony	P	All colors	3-4 ft.	June
Phlox	P	Pink, white	2-3 ft.	July-Aug.
Poppy, Oriental	P	Red, pink	3 ft.	May-June
Sweet Pea	A	All colors	12 in.	April-Oct.



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Leap Year in Nature

It is possible that this article may be read on February twenty-ninth, the day whose appearance on our calendars tells us it is Leap Year. Possibly some have already learned that it is Leap Year because of a Leap Year party, or some other festivity in which custom has decreed certain unusual privileges to one or the other sex. The usually aggressive male sits back and is asked. Instead of the man paying the bill "the woman pays". The lady calls for the gentleman of her choice while the men live on Uneasy Street wondering whether or not they are to be chosen. Possibly some perfectly eligible gentleman with an inferiority complex is relieved of the necessity of making the big decision because the lady exercises the prerogatives conferred on her by Leap Year custom.

In response *to many requests from teachers, school principals and others, tobacco advertising will not be carried hereafter in* Nature Magazine.

Of course if we study the customs of humans the world over and at various times in history we realize that what is etiquette at a certain place in the world or time in history may be very much otherwise at another time or place. Outside of human nature, however, we find the habits of living things little influenced by Leap Year. There are a considerable number of species of creatures in which those duties and privileges ordinarily considered as belonging to the female are assumed by or assigned to the male and these might make pertinent topics of study at this time this year.

Before going into this it might be well to agree as to what characters are essentially feminine and which are masculine. The care of young is generally considered the privilege of the female of the species even though many a male has caught cold through walking bare-foot at night on a cold hard-wood floor while attending to his young. Aggression in courtship is generally considered essentially masculine though this is certainly not always confined to that sex among humans. The wearing of gay colors is generally the right of the male among birds though among humans, except for Christmas neckties, the female wears the gayer colors. The provision of food and protection to the family is generally considered the obligation and pleasure of the male. Now let us see how frequently this division of privilege and authority is reversed in Nature.

For the last few summers I have had the opportunity of watching families of phalaropes, those little birds that look like long-legged, slender sandpipers. They usually are to be found in threes, one of the three being much more brilliantly colored than its mates. At first one is inclined to assume that the more showy bird is the male. This is not the case, however, as the female phalarope wears the gay feathers. She also maintains two home nests and two husbands. In these home nests, she lays eggs which her husbands dutifully sit upon and hatch. With our commoner bob whites we find that because of the fact that the male may assume the care of the first brood the female is able to sit upon a second clutch of eggs and raise twice as many young in a year as might otherwise be the case. In rearing bob whites in captivity, they frequently give their newly-hatched chicks to the care of the cock birds. In Nature the males and females take turns sitting upon the eggs. The wearing of gay feathers is not limited to the male with our common belted kingfisher.

A number of species of fishes have habits suggesting that the duties of one sex are assumed by the other. The common stickleback has an interesting home life in which most of the duties and privileges are assumed by the male. The male builds the nest, courts a number of females that lay eggs in his nest and then stands by to protect the young. This is not the case with our catfish in which the female stays by the home nest and brings up the young that follow in her wake until they are of considerable size. With the black bass however the male assumes responsibility for the family.

Among the amphibia we have the peculiar breeding habits of the hellbender to think of in this connection. The male protects the eggs laid by his mate until the young are able to shift for themselves. Unfortunately for the strict use of this in connection with a study of home-life habits we find that in reality the male is protecting his offspring because of their food value to himself. Fortunately for the young their paternal parent's digestion is not rapid at the breeding time.

Even among insects and other invertebrates we find reversals of family duties and relationships. In some butterflies the female is certainly the more aggressive in courtship. With one of the "electric light bugs" or giant water bugs the female lays her eggs on the back of the male and allows the gentleman to assume all of the family responsibilities providing there are any such. The small male spiders that pay court to the larger females frequently are welcomed as a meal rather than a mate.

NATURE NEWS AND VIEWS

Official State Flowers

We have had several requests from our members for a list of the official state flowers of our states. Perhaps we can answer others who may wish the same information by printing the following list of state and provincial flower emblems:

Alabama, Goldenrod; Alaska, Forget-me-not; Arizona, Giant cactus; Arkansas, Apple blossom; California, Golden poppy; Colorado, White and Lavender Columbine; Connecticut, Mountain Laurel; Delaware, Peach blossom; District of Columbia, American Beauty rose; Florida, Orange blossom; Georgia, Cherokee rose; Idaho, Syringa; Illinois, Native violets; Indiana, Tulip tree; Iowa, Wild rose; Kansas, Sunflower; Kentucky, Trumpet vine; Louisiana, Magnolia; Maine, Pine cone and tassel; Maryland, Black-eyed Susan; Massachusetts, Trailing arbutus; Michigan, Apple blossom; Minnesota, Moccasin flower; Mississippi, Magnolia; Missouri, Red haw; Montana, Bitter-root; Nebraska, Goldenrod; New Hampshire, Purple lilac; Nevada, Sage bush; New Jersey, Violet; New Mexico, Cactus; New York, Rose; North Carolina, Daisy or Goldenrod; North Dakota, Wild prairie rose; Ohio, Scarlet carnation; Oklahoma, Mistletoe; Oregon, Oregon grape; Pennsylvania, Laurel and Tulip tree; Rhode Island, Violet; South Carolina, Yellow jasmine; South Dakota, Pasque flower; Tennessee, Passion flower; Texas, Blue bonnet; Utah, Sego lily; Vermont, Redclover; Virginia, Dogwood; Washington, Rhododendron; West Virginia, Rhododendron; Wisconsin, Violet; Wyoming, Indian paint brush.

Soil Expert Named

Lars G. Romell of the Swedish Forest Experiment Station at Stockholm has been appointed to the Charles Lathrop Pack Research Professorship in Forest Soils at Cornell University. The establishment of this professorship, the first of its kind in an American university, has been made possible by the recently anounced endowment of $130,000 for the chair with additional gifts for its operating funds from the Charles Lathrop Pack Forestry Trust. The investigation by Dr. Romell will undertake to coordinate studies in several fields of science and apply all the obtainable knowledge to the special problems of forest soils.

Colorado Save Wild Life

Holding a position of popularity with hunters, Colorado, in order to prevent the extinction of its wild life, has established large game reserves on which shooting is prohibited by law. In the state there are now eighteen game refuges totaling 3,086,897 acres, considerably more than two-thirds of which are within the National Forests. The Forest Service cooperates with the state in enforcing the law and protecting wild life.

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Horticultural Clearing House

As the first step in a movement to provide a clearing house for national horticultural interests and to further American horticulture, a Survey Committee is now at work under the title of United Horticulture to study the question of cooperation and prevailing conditions with a view to the formation of a program. Mr. Robert Pyle, chairman of this committee describes it as "simply a medium or centralizing mechanism for assisting the organizations now active and increasing their effectiveness, and, where new bodies are called for, to facilitate their formation and give them the benefit of past experience and knowledge." Some of the questions which logically may come before the committee include: provision for registration of new plant varieties with protection of the rights of their producers; standardization of plant names on a permanent basis; protection of native plants; support of much needed research, arboretums and other public and educational plant collections; spreading information about plant diseases and pests; and in general combating present day ignorance of the close and essential relations of horticulture to the public welfare. The committee is made up of Mr. Pyle, Mrs. Francis B. Crowninshield, Paul C. Stark, Alfred C. Hottes, David Burpee, and John C. Wister. E. L. D. Seymour, 218 Hilton Avenue, Hempstead, N. Y. is executive secretary of the committee.

Mother Love

One extremely hot summer evening in Southern Illinois, writes Cecilia Whelpley of Medford, Oregon, my brother and his family were driving along a country road with a woods on one side and a creek on the other. Suddenly a mother weasel with five little ones came out of the woods and started, single file, across the road, evidently going to the creek for a drink. After watching them until they were almost across, my brother got out and picked up one of the babies to show the children. The mother weasel immediately turned and hurried the other little ones back across the road and into the woods out of sight. She then returned to the road and, after looking at my brother a moment, went straight to him and stood with her hind feet on his foot and her front feet on his leg and begged for her baby, making a soft little whining cry. When the baby was placed on the ground by her side, she hurried it along in front of her into the woods where she had left the others.

Cardinal Goes North

Mrs. Ora D. Sweet of Auburn, New York, was thrilled last December 11 to observe a female cardinal in a cherry tree in her yard. She has been feeding and studying birds for many years but this is the first cardinal to accept her hospitality. The same bird, without doubt, was reported near there four days later. Those who live north of the regular range of the cardinal will get a "kick" out of seeing this notable visitor.

Planting Time Soon

March winds blow winter away and bring vague uneasiness—a restless surge—spring fever. The best panacea we know is garden planning. Sit down in a cozy corner and plant a "White Paper" garden. But first, send for a copy of the new "Kentucky Bred" Garden Book—new, complete, fascinating. Write today.

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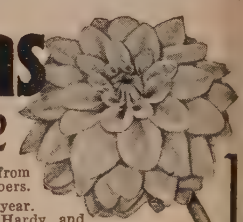

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ROSES Own root, 2-year. Guaranteed Hardy and to bloom from early Summer to freeze-up. Each, 75c; three, $2.20; six, $4.25; dozen, $8.25.

GLADIOLUS Fifty, $1.25; hundred, $2.25. Fifteen splendid varieties assorted
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RAINBOW COLLECTION—1 bulb each of 30 different varieties, many rare colors, including lavender, orange, rose, Holland Giant, etc. Would cost nearly $3, if separately labeled. Sent postpaid with easy planting directions, for only $1. Will bloom this Summer.

Send for my interesting 36-page illustrated Gladiolus Catalog. It's free.

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GLADIOLUS

30 Large Bulbs for only $1.00

A wonderful mixture of colors such as you will be proud to grow in your own garden or send as a gift to your flower-loving friends. Order now. We pay postage.
The Little Flower Garden Box 621 Haverford, Pa.

Gorgeous Flower Garden $1.

20 Finest Hardy Perennial plants, your choice, (assorted) Giant Pinks, Sweet William, (Grandiflora) Hibiscus, (red and white) Gaillardia, Pyrethrum, Iris. $1. Or 20 Giant Pansies, $1. Strong plants, ready-to-bloom. FREE with each order one beautiful Tree-of-Heaven. Fairacres Nurseries, Arvada, Colo.

Civic Association Acts

At its twenty-fourth annual meeting the American Civic Association's executive board went on record in support of the establishment of both the Shenandoah and Great Smoky National Parks; in approval of such changes in the boundaries of National Parks as will strengthen the National Park system; strongly opposed to the elimination of the Bechler Meadows from the southwest corner of Yellowstone National Park; in favor of the McNary-Woodruff Bill for a ten-year program of National Forest acquisition in the East.

Mankind's Allies

A fine editorial in the Minneapolis *Journal* under the caption "Mankind's Allies in Danger" was recently brought to our attention. It emphasized in a strong way the important part that birds play in our scheme of things and urged that residents of the northern states give thought to the birds in the snow-covered months of winter to provide them food. It would be a fine thing for our wild friends if every newspaper would plead this cause actively in the winter.

Wise Mother Duck

Dogs who save babies, and horses who lead their fellows out of burning buildings, must move over in their niches in the animal Hall of Fame to make room for the squat, web-footed frame of a modest, unassuming mother duck, whose intelligent action recently saved her brood of 14 from a night-long vigil in the depths of a well, and probable destruction.

The story is told by Mrs. Sarah E. Bennett, of Norwalk, Connecticut. One day shortly after the duck, a dark Moscovy, had hatched her brood, she appeared at an unusual hour at the door of the house, and insisted on telling her tale to the household in loud quacks, alternating her remarks with short sallies out into the yard, at the end of which she would look back at the uncomprehending individuals in the doorway. Finally, she was followed after a particularly harsh series of ejaculations on her part, and led to the well, in which was found her entire family calmly swimming about in the icy water in the partial darkness. They were promptly rescued, whereupon the mother lectured them at length. According to Mrs. Bennett, the young ducklings had probably got into the well before several barrels were drawn from it, thus lowering the water level below the poin where they could scramble out.

Billboard Calendar

Under the chairmanship of Mrs. C. Oliver Iselin, the Billboard and Roadside Committee of the Garden Club of America has published a year-around reminder of roadside good manners. It is in the form of an attractive calendar making use of varied thoughts on roadside beautification, and is being sold to members of the Garden Club and others for fifty cents.

Plant PACHYSANDRA— it grows in the shade

PACHYSANDRA, the wonder plant of Japan, grows luxuriantly under trees, quickly covering unsightly, bare spots with a solid carpet of rich growth.

PACHYSANDRA benefits the health of trees by conserving ground moisture, eliminating weeds and duplicating actual forest conditions of the soil.

PACHYSANDRA, a hardy evergreen, propagates itself through its root system.

My special method of growing and handling enables me to supply PACHYSANDRA, large or small quantities, at very economical prices.

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IT'S a pleasure for any flower lover or kitchen garden enthusiast to turn the pages of this 1928 edition. Hundreds of illustrations, including fine color plates, offer unlimited suggestions in Seeds, Plants and Bulbs and articles by experts tell you just how to get the best results with them.

A copy free if you mention Nature Magazine
Also Special Rose Catalogue on Request

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THE HEDGE OF
BEAUTY—DENSITY—PROTECTION
the best of all hedges.

It's a shame to do it, but these plants are growing on leased land that must be cleared. Every plant is 3 years old, healthy and exceptionally well rooted, one of the prettiest fields of Barberry we have ever seen.

Take advantage of this offer now

Here is a rare buy for those needing barberry for hedges and decorative landscape planting. Grows quickly and withstands cold climates.

SPECIAL PRICES WHILE THEY LAST
18-24 inch size - $15.00 per 100
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Order at once for spring shipment

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We have prepared a most interesting catalogue, illustrated in full colors, containing a wealth of information about *trees, shrubs, roses, evergreens and perennials,* which will help you in garden or landscape planning. Send the coupon today for your copy It's *Free,* postpaid.

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Our "Star Guide to Good Roses," 100 pages profusely illustrated in color, pictures and describes over 200 rose varieties. It also tells about America's twelve best roses—universally liked and most satisfactory for garden use—the twelve roses that grow well and bloom profusely almost everywhere.

"Star Roses," the only trade-marked roses, are guaranteed to bloom—thus you are assured rose satisfaction. The "Star Guide" is FREE—write today!

The Conard-Pyle Co.
Star Rose Growers
Robert Pyle, *Pres.* Box 28
West Grove, Pa.

Guaranteed to bloom

Inventors Lend Ear!!

To the end that progress may be made toward devising humane traps for catching fur-bearing animals, the National Association of the Fur Industry, in cooperation with the American Humane Association, has announced two sets of prize contests. The first is for a $10,000 prize for which specifications are exigent and if fulfilled will be a tremendous contribution to humanity. The second prize contest is an annual one with three prizes of $100, $35 and $15 for the trap showing the greatest progress toward humane trapping. These traps may also be entered in the larger contest. The annual contest is directly under the auspices of the American Humane Association and full details of it can be obtained by addressing the Association at 80 Howard Street, Albany, New York. Information relative to the other contest should be obtained from David C. Mills, National Association of the Fur Industry, 370 Seventh Avenue, New York City.

A Good Husband

Every year, writes Mrs. L. M. Kneeland of Chicago, the coming of the first robins is awaited eagerly. One spring they arrived early and immediately set up a home within close observation range. The mother bird started her family, and then came a heavy spring storm with drenching rain. Mother bird looked nervous but through the pelting drops came the father of the family. He perched on the edge of the nest and spread his wings over his mate, forming a fine canopy until the rain stopped. The family was reared without difficulty with such cooperative parenthood.

Birds of the States

We have received from Mrs. F. T. Bicknell, president-emeritus of the Los Angeles Audubon Society, a request to publish a list of state birds. The list follows and we would appreciate any addition to this list from our members, together with data as to when and where any of these birds were selected. The following list lays no claim to completeness:

Florida—Mockingbird
Kansas—Eastern Meadowlark
Kentucky—Cardinal
Louisiana—Pelican
Maine—Black-capped Chickadee
Maryland—Baltimore Oriole
Missouri—Bluebird
Nebraska—Western Meadowlark
New York—Bluebird
Oregon—Western Meadowlark
Texas—Mockingbird
Virginia—Robin
Wisconsin—Robin

Station Site Chosen

Philadelphia has been selected for the headquarters of the Allegheny Forest Experiment Station of the U.S. Forest Service. The station will work in cooperation with he University of Pennsylvania.

Added!

The Perfect YELLOW ROSE
Souvenir de Claudius Pernet

—spell-binding yellow throughout, from perfect bud to mammoth bloom, holly-like foliage. Included now for first time—if you order immediately—in COLLINS FAULTLESS FIVE, sold to make friends, not profits. Includes this finest yellow; the finest white, DBL.W. KILLARNEY; big pink, COLUMBIA; fragrant deep red, AMERICAN LEGION and rose pink, marvel PREMIER.

All 5 Strong-rooted, 2-yr.-old Bushes, cut back to 2 ft. high. $1.95 post paid

GUARANTEED to grow and bloom for you, or money back as detailed in our 1928 HELPFUL PLANTING GUIDE, FREE. Includes many special offers, illustrated in natural colors, on Dahlias, Chrysanthemums, other Perennials, Gladiolus, Roses, Evergreens, Privet and Barberry Hedge, Vines, Trees, etc.

ACT NOW. Send $1.95 today, all five rose bushes mailed postpaid to your home when planting season opens. If beyond Mississippi River, add 20c.

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Est. 1860 **Arthur J. Collins & Sons, Inc.**
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ROSE BUSHES

Two- and three-year old $3.95 per doz.; $27.00 per 100. Postpaid Insured Delivery.

Souvenir De Claudius Pernet, Rapture, Mrs. F. R. Pierson, Columbia, Templar Commonwealth, Ophelia, Silver, Columbia, Madam Butterfly, Premier, Double White Killarney, America. Bloom from these bushes won first prize at the International Flower Show, New York City, four years in succession, 1924, 1925, 1926, 1927.

Rambler Roses—2 and 3 year old $1.95 for 6. Dorothy Perkins, Crimson Rambler, White Dorothy Perkins, Excelsa, American Pillar, Tausendschon.

Climbing Roses—6 for $2.95 the finest varieties that grow. Dr. Van Fleet, Silver Moon, Paul's Scarlet Climber, Aviator Bleriot, Mary Wallace, Climbing American Beauty.

All Roses add 25c per order west of Mississippi

Hardy Chrysanthemum plants, all colors, $1.50 per doz. $11.00 per 100. Postpaid Insured Delivery.

Lily-of-the-Valley the sweetest flower that grows, two-year old pips, 25 for $1.00; 100 for $3.00. Postpaid Insured Delivery.

Order now for planting time. Booklet on request. Honorable treatment guaranteed.

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SUMMER HOMES IN CANADA

Canadian Real Estate offers big opportunity for investment. Beautifully situated cottage sites islands, fishing and hunting camps in Muskoka Highlands of Ontario and Georgian Bay. Easily reached by rail or motor car from any United States point. Now is the time to acquire desirable property, while prices are low. Prices from $50 up. State requirements. Write. Particulars free

C. E. ROBINSON, 35 Burris St., Hamilton, Canada

Fellowship to Mr. Bartsch

Dr. Paul Bartsch, Curator of Mollusks at the U.S. National Museum and a member of the Scientific Consulting Board of Nature Magazine, has been awarded the Walter Rathbone Bacon travelling fellowship for 1928-1930. Dr. Bartsch will make use of it to collect material for the completion of a monograph he has long had under way on the land shells of the West Indies. The fellowship was established in a bequest to the Smithsonian Institution by Mrs. Virginia Purdy Bacon as a memorial to her husband. Dr. Bartsch is the second member of our Scientific Consulting Board to hold this fellowship, Dr. Waldo Schmitt having held it during 1925-1927.

Mississippi Conservation

"To stimulate interest in conserving native plants and animals for their economic and aesthetic value and to advocate the establishment of wild life preserves for educational and recreational purposes," the Mississippi Association for the Conservation of Wild Life was organized last year. Its membership and influence is growing rapidly and its educational work has been furthered by the maintenance of booths at county and state fairs. The organization has a fine program of conservation planned, and starts its work with a considerable charter membership, many drawn from the Agricultural and Mechanical College, where the movement had its inception. Conservationists in Mississippi should get in touch with Miss Fannye A. Cook, executive secretary, Agricultural and Mechanical College, Mississippi.

Biologists See Films

At the 714th regular meeting of the Biological Society of Washington, D. C., Mr. Arthur Newton Pack showed the motion pictures taken by the recent expedition of the American Nature Association to Glacier National Park. The films include remarkable action pictures of white goats jumping, bighorns, bears, beavers, marmots and other wild life of the region. They were enthusiastically received by the members, most of whom were well acquainted with the physical difficulties attendant upon obtaining such films. Vernon Bailey followed the pictures with a discussion of the gentle dispositions and intelligence of the beavers. He asserted that a large old beaver is just as gentle as a youngster if not frightened.

In Covered Wagon Days

Past her father's home in Wiota, Iowa, ran the county road and over it cattle and horses passed daily in numbers and oxen dragged their heavy carts, writes Mrs. Mary W. Clark of Fort Smith, Arkansas. One day a nest was found in a clump of grass in the middle of the road, and in it a mother bird sat on her eggs. The young were hatched and grew safely up amid the clumping hoofs and none was injured. Who says that Nature does not care for her own?

A Grand New Decorative Dahlia

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Tubers, Each $7.50. Plants, Each $3.75

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Gettin'-Ready Time

TIME for us fellows to check up on the old duffle bag—dust off the old tackle and polish the old musket. For the cabins and summer homes are callin'. Nature's scouts—the birds and trees and waters—have started to beckon us vacationward.

And how about your Rustic Hickory Furniture?

The best part of vacation time is the rest after the fun. Rest is what we really go on vacations for. Ever think of that? And nothing is so completely soothing and comfortable as Rustic Hickory rest!

This unique furniture has been the sportsmen's choice for over 25 years. Made from the finest second-growth hickory, by expert craftsmen, it is the last word in comfort, natural beauty and durability. It is of the woods and for the woods. Made in 130 styles for lawns, porches, and all interiors. Everything from beds to bird houses.

Invest in better rest this season.
Send for our beautiful catalog D.

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Rhododendron-bordered Paths Produce Gorgeous Effects

Among all our native shrubs Rhododendrons reign supreme, majestic among foreign introductions, regal in splendor of color, a heritage handed down for centuries to adorn our present-day estates and grounds.

For year-round decorative value Rhododendrons cannot be excelled. In spring the wonderful colors; in summer the cool foliage; in autumn and winter the deep green relieves an otherwise bare landscape.

From our nurseries we supply five varieties of Rhododendrons in sizes adapted for every purpose. From our stations in the Virginias and North Carolina we supply collected stock for large plantings.

Our booklet, which gives full information will be mailed on request to interested planters who reside east of the Mississippi River.

LaBars' Rhododendron Nursery, 1104 Bryant St., Stroudsburg, Penna.

GUARD YOUR ROSES
from Mildew and Black Spot . . . .

FUNGTROGEN acts like magic on mildewed roses and other flowers. Spray a thin, *invisible* film of Fungtrogen on diseased plants and almost overnight Mildew or Black Spot is under control. Easy to apply. By its use amateurs get professional results, larger blooms, sturdier plants. No discoloration.

Fungtrogen is highly concentrated, but easily soluble in water. Sprays perfectly without clogging nozzles.

Prepaid, half-pint $1; pint $1.50. Dilute 60 times. Ask your dealer or send check.

Write for free bulletin, "Black Spot Control"

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Makers of companion sprays. Aphistrogen: for plant lice; Insectrogen: for leaf chewing insects.

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Sod in six weeks! A rich, velvety stretch of lawn that chokes out weeds before they can grow! A deep, thick, uniform turf that makes your home a beauty spot! That's what you'll get if you plant Scott's Creeping Bent.

The New Super-Lawn

Creeping Bent — long recognized as the ideal grass for golf putting greens — is now producing Super Lawns. Instead of sowing seed, you plant stolons or the chopped grass — and in a few weeks you have a luxuriant lawn like the deep green pile of a Turkish carpet!

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This little book "Bent Lawns" is free to you. It is a valuable treatise on how you can have beautiful lawns. Write today for your copy.

Sanctuary Is Enlarged

Twenty-six acres have been added to the Crooked Pond Wild Life Sanctuary in Boxford, Massachusetts, through a gift from the Associated Committees for Wild Life Conservation of the State. This organization represents the Massachusetts Audubon Society, the Massachusetts Fish and Game Protective Association and the Federation of Bird Clubs of New England, Inc.

A Forestry Voyage

Under the direction of Dr. C. A. Schenck the fifth annual study tour of continental forests of Europe will be conducted with sailing date set for March 17. This trip was first organized by Dr. E. A. Ziegler of the Pennsylvania State Forest School and details of this year's trip can be obtained from him by writing to the school at Mont Alto, Pa.

State Park Popular

At least five million people enjoyed the various sections of the Palisades Interstate Park of New York and New Jersey in 1927, according to the Commissioners of the Park. Bear Mountain Inn, with its restaurant and cafeteria and meal services to campers, supplied more than six hundred thousand people with food and refreshments.

A Robin Pet

For fifteen years Dr. and Mrs. W. B. Walker of Bennington, Vermont, have enjoyed the friendship and confidence of a wild bird pet. A decade and one-half ago a small boy brought to them a fledgling robin that had fallen from the nest. "Bobby" was fed and cared for. It grew and prospered and took up residence in a cage that it would not leave. So the bird lived, happy and giving happiness with a cheery song. But old age crept on and recently "Bobby" passed on to that bourne whence no bird returns.

A Source Magazine

A new magazine is shortly to be issued under the editorship of Kirke Mechem of Wichita, Kansas, and under the title of *Contents*. It proposes to bring out simultaneously with the appearance of many magazines, a reference to the articles in these publications. This is to be effected through the cooperation of the several publications themselves.

Jack Feeds Blue Geese

Many Canada geese have found Jack Miner's sanctuary at Kingsville, Ontario, a welcome stopping place on their migratory flights, but this year he had new guests in a group of blue geese. These birds do not customarily migrate in the vicinity of the sanctuary but it rather looks as though they had met some other travellers and been advised to stop by for a meal.

Bird Banding Results

Results of bird banding during the period from the first of July, 1923 to the last of December, 1926, have been compiled into a bulletin by Frederick C. Lincoln and published by the U.S. Biological Survey. The bulletin chronicles the tremendous advance in bird banding work and points to the near future when the data gathered by this method will enable definite conclusions on the migratory habits of various species. Those interested in bird banding will find the bulletin interesting and can obtain it by asking the U.S. Department of Agriculture to send it.

About a Friend

Every editor has friends he never meets. They are friendships born of correspondence and response to what the editor has tried to create. Frequently they are unknown friendships. Such a one was Henry Wadsworth Gustine, member of the American Nature Association since its birth, reader of Nature Magazine from its first copy. It was the last publication that he continued to read. We were therefore deeply pleased to receive from his cousin, Ethel Arbour Chase of Chicago, a fine little booklet in commemoration of Mr. Gustine's contributions to humanity.

A Cage Romance

Twice her love bird seemed pining away when he lost his mate, writes Mrs. Edward Engle of Yreka, California. Finally, when the last bereavement happened, Mrs. Engle opened his cage door and let him fly to the canary cage in another room. In he went and ever since the two male birds have been the best pals. They live in the same cage and the love bird eats his own meal and then feeds the canary, who stands by fluttering his wings waiting. When the canary picks at one's finger the love bird raises a row and tries to drive him away and protect him.

Summer Nature Camps

Under the auspices of the Pennsylvania State College two Nature summer camp sessions will be held this year in Stone Valley among the Tussey Mountains. The sessions will be from June 28 to July 19 and from July 18 to August 7. Full details about the courses, tuition and other plans can be obtained by writing to the Pennsylvania State College, State College, Pa.

Government Bulletins

Recent government bulletins of more or less general interest include *Our Migrant Shorebirds in Southern South America,* by Alexander Wetmore. It is specially significant in view of additional protection recently accorded shorebirds under the migratory bird treaty. Another bulletin by David Griffiths discusses Palestine hybrid irises and is of interest to garden lovers. The bulletin is available on request. Another bulletin is devoted to Rabbit House Construction and is available for five cents from the Superintendent of Public Documents, Washington, D. C.

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"Ask the Planter Who Plants Them"

Order direct from this advertisement. A copy of our new Seed and Nursery Book given with each order. Also sent free on request. It is full of valuable information on Vegetables, Flowers, Fruit Trees, Berry Plants, Deciduous Shade Trees, Evergreens, Ornamental Shrubbery, Vines, Hardy Perennials, Roses, etc.

LONG BOY RADISH 3 Feet Long

An exceedingly sweet flavored, long white Radish from Japan. Grows 3 feet long; very crisp and brittle. One of the best for eating raw, and is used extensively in Japan for pickles and cooked like turnip.

Pkt., 10c; 3 pkts., 25c.

Garden Huckleberry

Grows from seed the first year. Yields immense crops of fruit and thrives in all climates. Larger than the common Huckleberry or Blueberry. Highly prized for pies, canning, etc.

Pkt., 10c; 3 pkts., 25c.

Orange Sunberry

A new berry. Resembles the Garden Huckleberry, except that the berries are of beautiful orange color and ripen nearly a month earlier. Will grow anywhere; very productive.

Pkt., 10c; 3 pkts., 25c.

Choice CACTUS Collection 10c

There is a great deal of pleasure derived in growing Cactus from seed. You will be surprised at the odd and curious plants as they come through the ground. A fine mixture of 30 rare and interesting varieties. Many of the flowers are wonderful for their great size, delicate coloring and fragrance.

Pkt., 10c; 3 pkts., 25c.

250 Gladiolus 25c

Select varieties; fine assortment of colors. 250 small bulbs (bulblets) for only 25c. 1250 for $1.00, postpaid.

Vine Peach

Ripe fruit in 80 days after seed is planted; make delicious preserves, sweet pickles and pies. Very productive.

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Yard Long Bean

Round pods 2 to 4 feet long, having the thickness of a lead pencil. Tender, of fine flavor and very productive. **Pkt., 10c; 3 pkts., 25c.**

Celery Asparagus

Celery Asparagus (Sea Kale) combines the flavor of Asparagus with that of Celery, and comes earlier in the season than Asparagus. A hardy perennial which is cultivated somewhat like Asparagus. Don't fail to get a bed of it started this season. **Pkt., 10c; 3 pkts., 25c.**

Oriental Flower Garden

50 handsome varieties from Japan and China. A choice seed mixture of flowers which are entirely adapted to our climate. **10 cents.**

Winter Watermelon

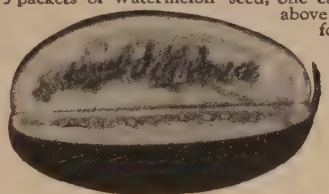
A home grown melon for your Thanksgiving dinner. A prolific long-keeping Watermelon. Flesh red, extremely firm, very brittle and deliciously sweet. Fruits taken from the field before killing frost and stored in a cool place will keep long into the late fall and early winter and retain their delicious sweetness and flavor. **Pkt., 10c.**

PRIDE OF YUKON. Earliest Watermelon grown. Ripe melons in 65 days, and unsurpassed for sweetness and quality. Fruits average 10 to 15 lbs. each. Has created a sensation wherever grown. **Pkt., 10c.**

NEW CLIMBING WATERMELON. An ideal melon for the small garden. May be trained and tied to trellis, etc. Melons about the size of a large cocoanut; rich and sweet. Fruit ripens for a long period, unlike other sorts which ripen their fruit mostly at one time. **Pkt., 10c.**

Watermelon Collection

3 packets of Watermelon seed, one each of the above varieties, for only 25c.



3 New Cukes

China Long. The finest of all Cucumbers for slicing. 20 ins. to 2 feet in length and 2 to 3 ins. in diameter; best quality; very few seeds and has no equal for crispness. Pkt. **10c**

Burgess' Earlibest. The earliest of all slicing Cucumbers, and holds its deep green color better than any other sort. Quality equal or better than most of the later sorts, and a great yielder. Pkt. . . . **10c**

White Wonder. Color, beautiful pure white. Begins to bear early and continues until fall. Firm, crisp, fine flavor. Fine for slicing and pickling. Pkt. **10c**

25¢ *Pays for 3 Packets Cucumber Seed—one packet of each variety.*

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10 CACTI (RARE SPECIMENS) POSTPAID FOR **2.50**

Handsome catalogue with very large assortment of fresh cacti seeds, only 25c. Catalogue has many Bargain offers and cultural directions.

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With more than 200 varieties of each. Peonies and Iris will add to the value and beauty of your property. Our prices are right.

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Plows, Seeds, Cultivates, Mows Lawns & Hay
For Gardners, Florists, Fruitmen—Walk or Ride
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Free HOW TO PLANT

This valuable little booklet "How to Plant" will help you. Sent **free** with our big 1928 catalog that lists everything needed for tastefully landscaping your home. Standard and rare varieties. Shrubs, Trees, Evergreens, Perennials, Bulbs and Fruits. **SPECIAL**—*3 Blooming Size White Regal Lily Bulbs for $1.00 Prepaid.*

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The Real Facts On Rock Plants

There's been a lot sold for such, that are not. There's a lot that really are, that most of you don't know about. Our new catalog straightens that all out.

The new catalog gives you a fine list of rock plants and hardy perennials. It's a practical guide to all the worth while things for the hardy garden. An important thing, is that practically every plant is illustrated.

As for prices—well, they are just what you would expect for fine, thoroughly dependable, field grown plants, 2 or 3 years old, that give immediate results.

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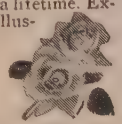
ROSES of *New Castle* is the title of a beautiful book on the culture of roses and other plants; gives expert experience of a lifetime. Exquisitely illustrated in natural colors; offers and tells *how to grow* our famous plants. Write for your copy. *It's free.*



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William Henry Maule
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How to build and plant inexpensive pools, and care for them summer and winter—all simply told in our new *Free Illustrated Catalogue*. Describes over 80 varieties of hardy flowering lilies at low California prices. *We pay postage on all orders.*

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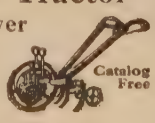

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A Barnyard Mixup

With space at a premium no doubt we really should rewrite the following story from the Red Bank, N. J., *Register*, sent to us by T. T. Wylie, into smaller compass. The story, however, is so well told that we are going to be extravagant with space for once. The story goes:

"Holmdel produces the champion nature story of the week, a story which is as true as it is appropriate to the Eastertide season. A hen, two kittens, a mother cat and Mrs. Daniel S. Ely were the chief actors in the nature story.

"Mrs. Ely had a big hen which wanted to set. Before placing eggs under the hen Mrs. Ely waited a couple of days to make sure that the hen really meant business. When Mrs. Ely went to put the eggs in the nest she was surprised at the ferocity with which the hen pecked at her. When she lifted the hen she was amazed and somewhat frightened to find two small jet black objects in the nest. Mrs. Ely's first thought was that they were young rats, but a closer inspection caused doubts.

"Mrs. Ely moved the nest and its contents to the kitchen to give the other members of the family an opportunity to inspect the unusual sight. During the moving process the hen sat on the nest with the two baby objects under her and made no attempt to get out.

"A more thorough inspection showed that what the hen was mothering were two newborn kittens. The hen was as proud of them as if they had been pedigreed poultry. Mrs. Ely had seen a cat hovering anxiously near the nest when she picked up the hen, but she had paid no special attention to the animal. The cat had ventured near the nest, but it beat a precipitate retreat when the hen pecked at it. While the nest and its unusual contents were being moved the cat had followed closely, uttering anxious meows.

"The cat proved to be the mother of the new-born kittens. What had happened was that the hen, which had been setting on nothing more than a china egg, had left the nest for a few minutes to get some food and take a dust bath. During the hen's absence the cat had utilized the nest and had given birth to kittens. Then evidently the cat left the nest and the hen returned and promptly adopted the new-born kittens as its own, fighting off the cat and fighting Mrs. Ely with all the fury of a mother protecting her babies against enemies.

"The cat is owned by a neighbor of Mrs. Ely. Its offspring was restored to it. The hen, after a brief spell of melancholy, started the job of setting again and it will soon have real baby chicks if all goes well."

PHOTOGRAPH CONTEST

THE FIRST *group of winning pictures in our monthly Photograph Contest will appear in the April issue. A remarkably large number of entries were received, giving the judges a difficult task. All unsuccessful photographs will be returned when the April issue appears. Entries received too late for the April issue have been entered for the May contest.*

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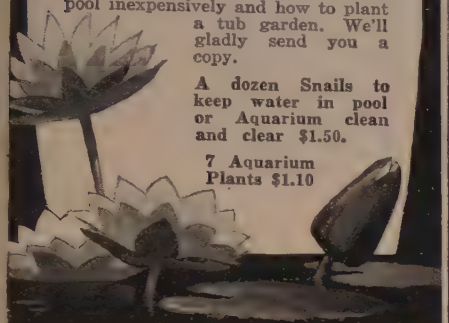

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Our Contemporaries

Robert Ridgway monopolizes,—and with most eminent right,—the January-February issue of *The Condor*. This issue, more than twice its usual size, is almost entirely devoted to a fine article by Harry Harris on Mr. Ridgway's life and notable contributions to ornithology. The article is profusely illustrated and includes a bibliography of Mr. Ridgway's published writings, which bibliography gives one an idea of his tremendous achievements. It is to be hoped that this issue of *The Condor* will be given wide circulation in the proper quarters in order that the Robert Ridgway Memorial Bird Sanctuary may be set aside within Mr. Ridgway's lifetime. There is no more worthy movement.

The January issue of *The American Botanist* contains its usual number of interesting botanical articles. We were specially interested in an editorial comment by Mr. Clute, the editor, on what Dr. E. Laurence Palmer calls "Natureless Nature". This phrase is coined by Dr. Palmer to describe book knowledge of natural life unsupported by actual field knowledge. Mr. Clute asserts that "the person that depends on the books for all his information is not studying Nature; he is patronizing her". That is well put. The books must be the incentive and guide.

In the November *Journal of Mammalogy*, Otis Wade discussed the early life of the thirteen-striped ground squirrel; Beatrice W. Johnson reports on experimental studies of the mice of Mount Desert Island, Maine; Tappan Gregory presents some flashlights of New Mexican mammals; Joseph Dixon writes on horned does, and W. H. Burt describes a simple live trap for small mammals.

An article by David Fairchild on the Allison V. Armour Expeditions of 1925-1927 in quest of living plants features the February issue of *The Scientific Monthly*. Another interesting article in this issue is on the purpose and progress of ocean-surveys, by J. P. Ault.

Those interested in India will find the article on explorations on the northwest frontier of India in the November issue of *The Geographical Journal*, publication of the Royal Geographical Society, helpful. There is also an article on the Nile during the past twenty years. The November issue of *The Australian Zoologist* is almost exclusively devoted to an address on a new theory of mimicry in insects written by A. J. Nicholson.

About the Corn Borer

Farmers will find a recent bulletin of the University of Illinois Agricultural Experiment Station of interest since it is entitled *Learning to Live with the European Corn Borer.*

Ferns That Bring the Woods' Grace to Every Place

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For dry, shady places. Plant them where flowers as a rule do not thrive.

10 Aspidium acrostichoides, 1 foot.
10 Aspidium marginale, 1 to 2 feet.
10 Dicksonia punctilobula, 1 to 2 feet.
5 Osmunda Claytoniana, 2 to 3 feet.

35 Strong Clumps in all for $5

Collection No. 3

Fine for moist, shady places; also for large rockery.

5 Adiantum pedatum, 1 foot.
5 Aspidium cristatum, 1 foot.
5 Aspidium acrostichoides, 1 foot.
5 Aspidium spinulosum, 1 to 1½ feet.
5 Aspidium marginale, 1 to 2 feet.
5 Asplenium thelypteroides, 2 to 3 feet.
5 Asplenium Filix-foemina, 2 to 3 feet
5 Phegopteris hexagonoptera, 1 foot.
5 Woodwardia virginica, 2 feet.

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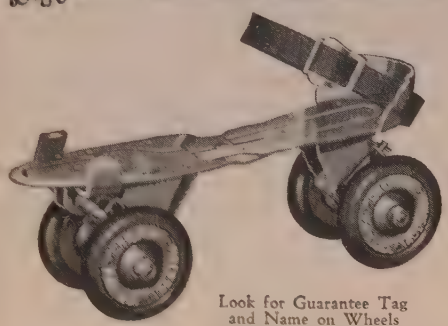

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Harmonies of Nature

Readers of Nature Magazine who enjoyed the fascinating articles by H. W. Shepheard-Walwyn will be particularly interested in his latest volume, *The Harmonies of Nature*, published in this country by Dodd, Mead and Company. Mr. Walwyn's point of view is a unique one, his Nature knowledge entirely competent and his literary ability notable. This combination makes for an extremely worthwhile book. The author takes scent, sound, color, taste, touch, natural life, refuge, race, motion and repose as the various harmonies for his study. He then shows in most entertaining fashion how Nature has contrived to harmonize them with the life of her creatures. An idea of his viewpoint may be gained from his assertion in the prologue that "Nature is one vast collection of poems." Not everyone sees these poems, but Mr. Shepheard-Walwyn certainly does, which makes his volume well worth its list price of three dollars.

Agriculture Handbook

Assembling under one cover in brief form the results gathered through research in various departments of the work of the United States Department of Agriculture, the first edition of the *Extension Service Handbook of Agriculture and Home Economics* has been brought out by the Government. At present it includes 953 pages and forms a basic volume to which looseleaf additions can be added as they are issued in the future. Copies may be obtained from the Superintendent of Public Documents, Washington, D. C. for $1.50.

Canada's Bird Poet

Wallace Havelock Robb is a poet of Canadian birddom, as well as the constant protagonist of bird protection in the Dominion. There comes now from the Ryerson Press of Toronto a most attractively printed volume under the title of *The Quill and the Candle*, between the covers of which are preserved some of Mr. Robb's poems. There is, also, an introduction authorized by His Royal Highness, the Prince of Wales, who discussed birds and bird study with Mr. Robb during the Prince's recent visit to Canada.

Flower Genealogy

The Annuals of Flower Land by Alice T. A. Quackenbush is by way of being a study of the family tree of our garden annuals. It is a glimpse of what the family Bibles of some of our "first families" of flowerland contain. It assembles interesting bits of garden gossip, of history, legend and lore about the blooms that nod in the summer garden, abide their year and leave us. The little volume, which is published by Macmillan and sells for $1.50, makes the seed catalogue entertaining as well as alluring.

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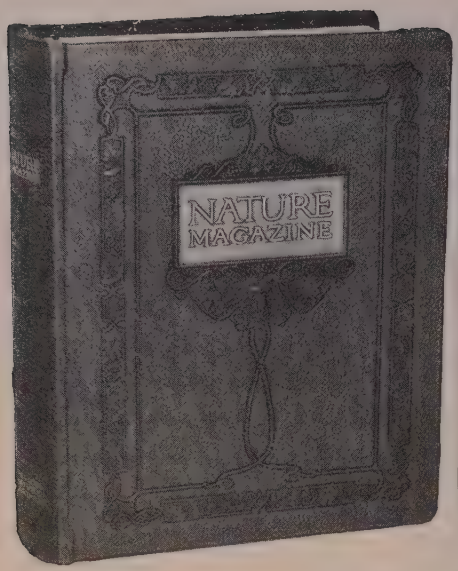

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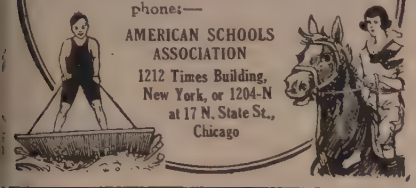

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March

"We heard
Werrenrath
last night!"

OF ALL the pleasant surprises! No sooner had we reached here than we discovered Werrenrath was to sing. Delighted? You know how much we wanted to hear him in the city and we couldn't get seats. Then to find him giving a recital right in our hotel! They have these musicales every March, I understand. The list of artists is amazing—Mary Lewis, William Gustafson, Lea Luboshutz, Maria Kurenko, Jeanne Gordon, Nikolai Orloff, Reinald Werrenrath and several others. . . . The Vernon Room (the musicales are held there) was simply lovely last night. Flowers everywhere! This place is always beautiful, but now—nearing Easter—it seems to be even more charming.

Would you care for a complete description of Chalfonte-Haddon Hall, and information about visiting there? We would be glad to answer any request.

CHALFONTE-HADDON HALL

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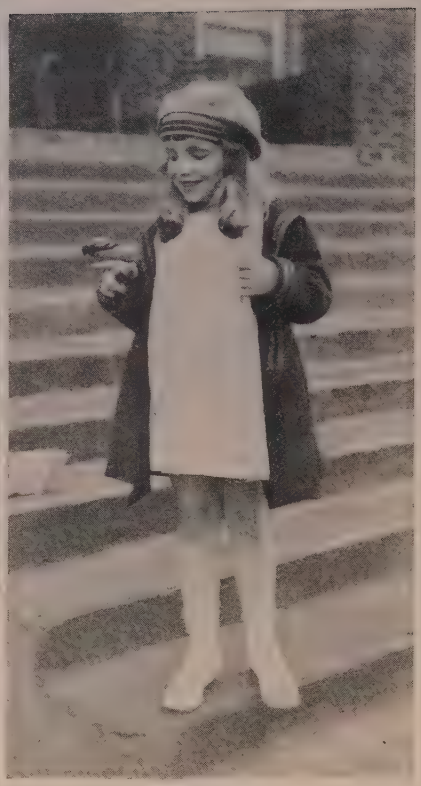
American Plan



A Goldfinch Friend

Jane Glenn of Morrilton, Arkansas, is proud of her friendship with birds and in this picture is talking with one of her goldfinch friends. Her father. John T. Glenn, snapped the picture and writes, incidentally, that his vicinity boasts wonderful resources in bird and wild flower life.

Add Tree Freaks

Here is another picture of Nature's pranks with some trees. This is an instance of two red gum trees near Owensboro, Kentucky, sent in by Henry S. Barton. The trees, Mr. Barton says, are about ten inches in diameter, stand about thirty inches apart and are joined thirty feet from the ground.

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On Animal Biology

Science of Animal Life is the title of William M. Barrows' textbook published by the World Book Company. It is designed as a text for a half-year course in animal biology with the hope that it will return zoology to its former popular place in the school curriculum. The author and the editors have endeavored to eliminate all unrelated facts and to follow a sane and practical middle course. At the same time there is adequate treatment of the new fields of biology. The book is listed at $1.76.

Field Museum Leaflets

Two more admirable leaflets have been added to those already published by the Field Museum of Natural History in Chicago. In the geology series Oliver C. Farrington contributes a leaflet on the Agate together with Berthold Laufer. Mr. Farrington discussed the physical properties and origin of these stones, while Mr. Laufer treats with their place in archaeology and folk lore. This leaflet, which is partially illustrated in color, is available for fifty cents. The other leaflet is an addition to the botany series, being devoted to *Sugar and Sugar Making* and written by James B. McNair. The price if this leaflet is also fifty cents.

Wanted—One Anchor

What tricks the earth has been up to and still is performing, and what explanations have been given of them, form the basis of Chase Salmon Osborn's latest volume which has the title, *The Earth Upsets*. The author tells the story of what is known of the movements of the earth and their effects on human civilization and happiness. It is not a scientific book in point of its handling although there is much of science in it. It is published by the Waverly Press of Baltimore and listed at three dollars.

The American Bison

A comprehensive pamphlet on the American Bison, his history and present status, has been written by Martin S. Garretson and published by the American Bison Society. This booklet was designed primarily to answer the variety of questions asked about this great mammal. Copies are available from the American Bison Society, N. Y. Zoological Park, New York City, for seventy-five cents each.

A Good Farm Crop

With the increasing appreciation on the part of the farmer of the cash value of the farm woodlot, the recent Bulletin 1534 F of the United States Department of Agriculture comes at a happy time. It is entitled *Shortleaf Pine Primer* and sets forth the qualities of this tree as a rapid-growing, high quality and seed-abundant species specially adapted to woodlot planting. The bulletin offers practical suggestions as to planting. It can be obtained free on request from the U. S. Department of Agriculture.

The Ninth Annual

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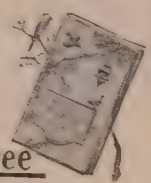

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Questions and Answers

The American Nature Association will be glad to answer each month such questions as its members ask about Nature

QUESTION: *Did such a person as Jonathan Chapman or "Johnny Appleseed" really live?—L. R. D.*

ANSWER: There is abundant proof that Jonathan Chapman, usually known as "Johnny Appleseed" was a real personage. He was born in the spring of 1775 probably near Boston, Massachusetts. He went to the middle west when a young boy and seems to have spent the best part of a long life helping to establish orchards in the new settlements. He is said to have died in 1846. Space does not permit more detail but you can purchase from the Chicago Historical Society a small pamphlet giving the main incidents of his interesting life.

QUESTION: *I have found three small balls made by spiders hanging in the woods. If I keep them what will come out of them? What are the balls called?—R. V. D.*

ANSWER: The balls found by you are evidently the egg cocoons of spiders. These usually hatch in the autumn and in some the young remain until spring. In many cases, however, the eggs of the spiders have been parasitized, and then small wasps issue instead of the spiders.

QUESTION: *Last summer I noticed several sponge-like lumps of thick jelly-like substance fastened to the rocks and limbs of trees in two or three feet of fresh water. Some say it is frog spawn but on examination it contained no eggs. Is it some sort of jellyfish?—G. E. G.*

ANSWER: The jelly-like substance probably consisted of colonies of bryozoans (or polyzoans), most likely *Pectinatella*. The

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individual zooids live in gelatinous tubes from which their tentacles are protruded; these aid the tiny creatures to capture the microscopic animals on which they feed. The zooids die in autumn and the mass disintegrates, but the race is carried on by gemmules or statoblasts which float away and become attached to various objects by means of tiny hooks.

QUESTION: *Can snakes hear?—L. G.*

ANSWER: This subject is quite generally avoided in books on reptiles and we believe that there is no very good evidence that snakes can hear at all. Careful experiments with the cobra have yielded rather convincing evidence that air-transmitted sounds cannot be detected, though vibration sent through stone or concrete bring instant responses. These tests were made to ascertain whether the flute-playing of snake-charmers had any effect.

QUESTION: *How long does it take crayfish eggs to hatch?—E. E. P.*

ANSWER: While we have not seen a record of exact observation, we believe that the eggs of crayfish usually hatch in from six weeks to two months. The time of breeding of different species of crayfish varies considerably, however, and the eggs may take even longer under some circumstances.

QUESTION: *I would like to obtain some of the work of Michaux?—A. S.*

ANSWER: There were several separate works by Andre Michaux and his son, including travels and treatises on the oaks and the tree flora of North America generally. The best and most easily available is the English translation of the journal of the elder man (1787-1796) in "Early Western Travels", by R. W. Thwaites, Volume 3, published in Cleveland, Ohio, 1904. His "Journal" was also published in French, either in part or whole, in several places, and notably by the American Philosophical Society. Michaux's works are very valuable and interesting as history, and also botanically.

QUESTION: *Please tell me the botanical name of bluebonnet.—M. M.*

ANSWER: The only plants we know of that are called bluebonnets are several species of the genus *Centaurea* of the Thistle Family. They all seem to be natives of Europe, but have been rather commonly introduced into this country, especially near the sea coasts. Another name is cornflower.

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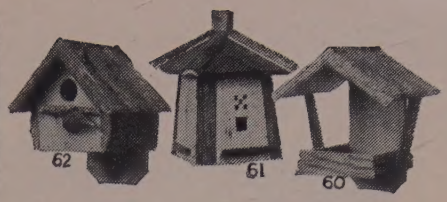

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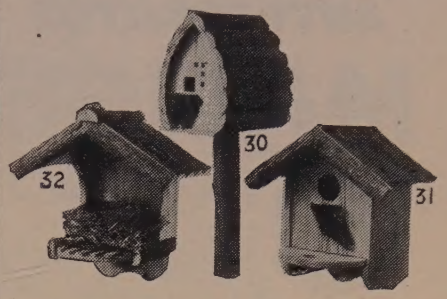

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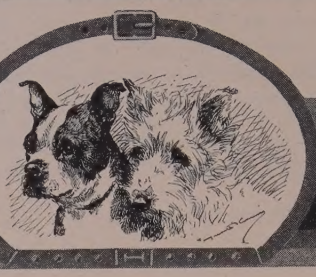

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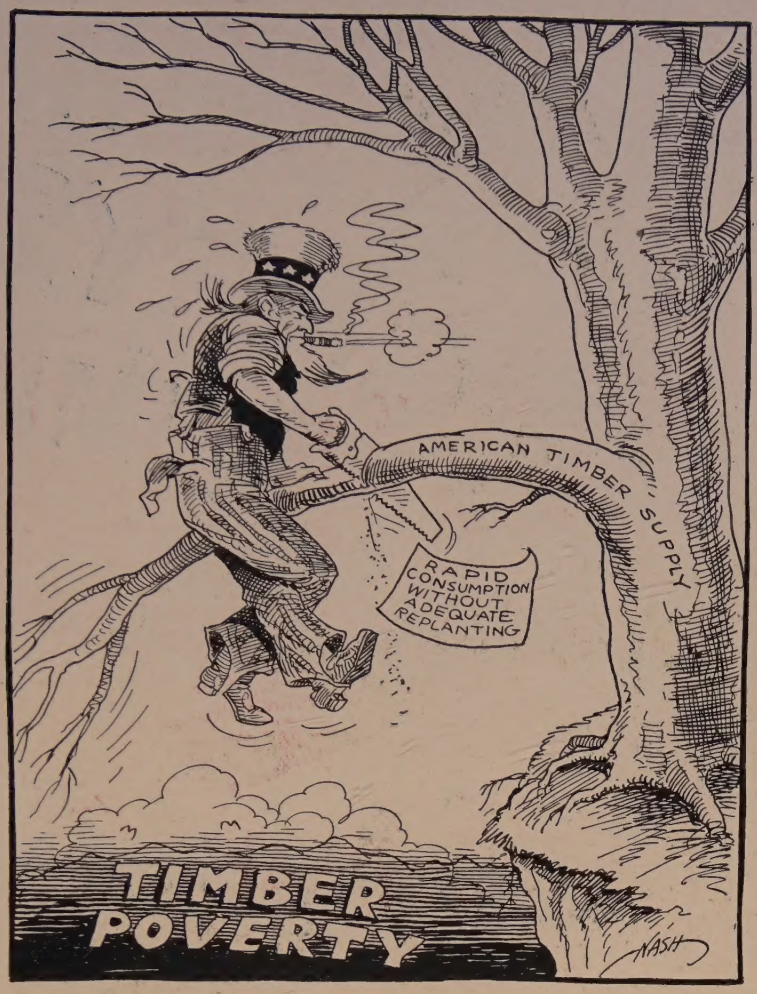
First Prize Cartoon



"PRUNING THE TREE"

No Wonder He Smiles!

Sam E. Nash Jr., of Tyler, Texas, Wins $250 Forestry Cartoon Prize

THE FIRST PRIZE of $250 for a forestry cartoon is awarded by the American Tree Association to Sam E. Nash, Jr., of Tyler, Tex. The seven winning cartoons of the 210 received are to be used in the Association's educational drive during American Forest Week in April.

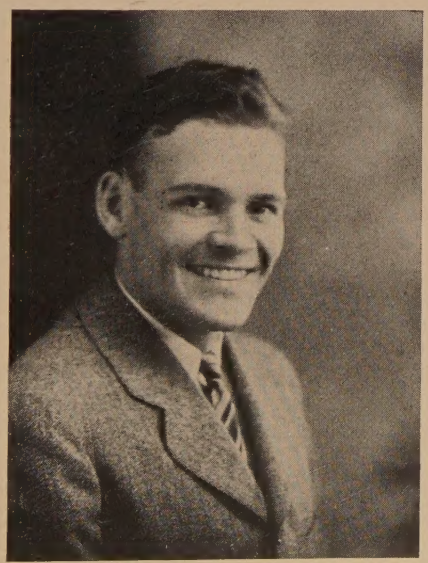
The other winners are: Second: Floyd Gottfredson, Richfield, Utah. $100. Third: Richard W. Tupper, Washington, D. C. $50. Fourth: James T. Shaffer, Lancaster, N. Y. $25. Fifth: F. D. Miller, Denver, Colo. $25. Sixth: Bruce Russell, Sierra Madre, Calif. $25. Seventh: William L. Addkison, Jackson, Miss. $25.

The title of the winning cartoon is "Pruning the Tree". The cartoon shows Uncle Sam cutting off the limb of a tree on which he is sitting and therefore is about to drop in the abyss of timber poverty. Young Nash who is a sophomore in college once drew a cartoon of Gov. Smith of New York and Gov. Edwards of New Jersey which so pleased William J. Bryan that Bryan gave him $10 for it. Nash earned his first dollar in a sawmill.

The judges who awarded the $500 were: Mrs. Mary K. Sherman, President of the General Federation of Women's Clubs, John Hays Hammond, J. N. Darling (Ding) noted cartoonist, Col. William B. Greeley, Chief Forester of the United States Forest Service, Dr. John T. Finley of the *New York Times*. The cartoons came from nearly every state and two foreign countries.

Action is shown in all the winning cartoons. The cartoon "Weakening" which won second place, shows an avalanche of deforestation smashing down a mountain side toward homes and industries in the valley. One tree,—our diminishing forest resources,—is making a brave fight to hold the landslide back.

SAM E. NASH, JR.



The third prize winner by Richard W. Tupper of Washington, D. C. also is very effective. Tupper pens a signboard in a devastated section which says eighty one million acres of idle land. The shadow across the devastation says lumber famine, and the cartoon is entitled "The Lengthening Shadow".

Thanks to the committee, whose task was difficult, the American Tree Association is able to announce the winners in time to use the cartoons before American Forest Week in April.

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